

SHANAN, Joel and SHARON, Miriam. Personality and Functioning of Israeli males During the Middle Years. Human Development. 1965. 8 (1) 2-15.

62 Israeli men, aged 39 to 61, of middle-class occupations and of European origin, were administered 5 cards of the T.A.T., the physiog cue test, 42 of these were also given the S.P.M. and 23 were given the Street-Gestalt test. Results showed a decline in personality variables related to ego strength and cathectic energy. Cognitive function, particularly flexibility of closure, showed decline, but to a lesser extent.

SHAW, Dale J. Estimating W.A.I.S. I.Q. from Progressive Matrices Scores. J. Clin. Psychol. 1967. 23 (2) 184-185.

Purpose was to establish efficacy of P.M. in the prediction of W.A.I.S. full scale I.Q. Subjects were 83 neuropsychiatric hospital patients. P.M. given as group test and within at least three days a full scale W.A.I.S. given individually. Correlation of .83 between P.M. score and W.A.I.S. full scale I.Q.s. Regression equation for predicting W.A.I.S. full scale I.Q. was obtained and standard error of estimate calculated. Since P.M. has been well established by previous research an instrument with considerable reliability results of present study indicate it can be considered a valuable and economical substitute for W.A.I.S. when only an I.Q. estimate is required.

SHEPPARD, Charles: FIORENTINO, D., COLLINS, L. AND MERLIS, S. Raven's Progressive Matrices (1938): Normative Data on Male Narcotic Addicts. Psych. Reports. 1968. 23 (2) 343-348.

P.M. was administered to 396 narcotic users. Norms are given and concepts basic to validity and reliability of P.M. are tested. Significant shifts were found in item order in sets A, B, C & D. Differences were not considered crucial for each test, so total structure of test was supported by sample. Discriminative power of most items ranged from good to excellent. Answer 4 was chosen significantly more often than other alternatives as the wrong answer in sets C, D and E, identifying the possible operation of a positional distractor. Test-retest reliability content and concurrent validity coefficients were .8. Correlation of formal education with P.M. was .2.

- C. SHEPPARD, Charles, FIORENTINO, Diane, COLLINS, Lois and MERLIS, Sidney. Performance Errors on Raven's Progressive Matrices (1938) by Sociopathic and Schizotypic Personality Types. Psych. Rep. 1968. 23. 1043-1046.

In an attempt to identify the existence of reasoning errors in psychiatric patients, the performance of male narcotic users defined as sociopathic (N=36) and schizotypic (N=34) by M.M.P.I. profile patterns was analysed for avoidable errors on P.M. An avoidable error was defined as a failure to solve an item whose difficulty level was within the testee's range of ability as measured by his performance. Construct validity was defined in terms of the inter-correlations of Raven's centile and item difficulty levels. Parametric and nonparametric tests of significance indicated that the schizotypic groups commit significantly more identifiable reasoning errors than the sociopathic group.

- C. SHEPPARD, Charles, FIORENTINO, Diane, COLLINS, Lois and MERLIS, Sidney. Further Studies of Performance Errors on Raven's Progressive Matrices (1938). J. Psychol. 1969. 71. 127-132.

In an attempt to identify the existence of reasoning errors in psychotic patients, the performance of male narcotic users defined as secondary sociopaths (N=20) paranoid (N=19) and schizophrenic mixed type (N=15) by M.M.P.I. profile type was analysed for avoidable errors on P.M. Avoidable error was defined as failure to solve an item whose difficulty level was within testee's range of ability to solve as measured by his performance. Construct validity was demonstrated with regard to intercorrelations of P.M. %ile score, item difficulty levels and number of avoidable errors. Tests of significance t showed paranoid patients committed more avoidable errors than the secondary sociopathic and mixed schizophrenic patients, but no difference was noted between the mixed schizophrenic and secondary sociopathic patients.

- SIGEL, Irving E. How Intelligence Tests Limit Understanding of Intelligence. Merrill-Palmer. Q. 1963. 9:39-56.

Unsystematic analyses of intelligence test responses negate the relevance of other cognitive factors influencing I.Q. Differences in cognitive style variables such as labelling behaviour and categorizing

should be analysed. Analysis of errors on I.Q. tests and qualitative analysis of verbal content might help us understand the "Law" of intelligence. A study of errors on the Raven Progressive Matrices showed that at ages 9 and 10 there are sex differences in kinds of errors made.

- A. SILVEY, J. Testing Ability Tests: Issues in the Measurement of Ability Among African Schoolboys. Conference Proceedings of East African Institute of Social Research. 1963.

The development of an effective administration of SPM with African children (from Bunganda and Salisbury) is described. Problems associated with timing and validity are discussed with reference to the effects of coaching and practice.

- SINGH, B.K. Personality correlates of academic achievement of College students. Ph.D. Thesis, Patna University, 1967.

- SINHA, Uma. A Study of the Reliability and Validity of the Progressive Matrices Test. Master's thesis, University of London, (London, England). 1950. Abstract: Brit. J. Ed. Psychol. 1951. 21:238-9.

Purpose was to investigate the reliability and validity of PM as an intelligence test for school-children.

Subjects were 310 children (140 boys and 170 girls) aged 8.0 to 13.0.

Results:

1. Reliability: with split half (corrected) 0.86; with Burt's analysis of variance 0.90; with Kuder-Richardson formula 0.90. (Average is 0.88, appreciably smaller than the figure given by Raven, using test-retest method).
2. Validity: Internal:- A factor analysis was carried out and the general factor accounted for only 36% of the variance.
External criterion:- (i) whole test:- the partial correlation between PM and results for another intelligence test amounted to only 0.54;
(ii) Item analysis:- Biserial correlation coefficients ranged from 0.2 to 0.8, averaging about 0.45.

For children over 10, there were too many easy items, doubtless because Raven's version was originally designed for use with mental defectives.

SITKEI, E.G. and MICHAEL, W.B. Predictive relationships between items on the revised Stanford-Binet Intelligence Scale (SBIS), Form L-M, and total score on Raven's Progressive Matrices (PM), between items on the PM and total scores on the SBIS, and between selected items on the two scales. Educ. and Psychol. Meas. 1966, 26, 501-506.

SLADEN, C.D. (Enfield College of Technology, Queensway, Enfield, Middx, England). Progress report on work with PM., 1970-71. Pers. Comm. 1972.

Work with children has been directed to studying the ways problems are solved, working from Piagetian expectations. It was hypothesised that, with the correct solutions removed, drawing of a correct solution would be easier than dictating to the E, since the latter involves verbalisation. No difference was found.

In a further expt. parts of the matrix were removed as well as the solutions (using Sets C, D, and E). It was not clear that this removal made problems harder.

Work has also gone ahead with writing a programme to process solutions to Matrices problems.

SLATER, Patrick. The Association Between Age and Score in the Progressive Matrices Test. Brit. J. Psychol. (Stat. Sect.). 1947. 1: 64-8.

Purpose of enquiry was to discover errors involved in treating association between age and psychological tests as rectilinear during period when men in Army, P.M. found to be more closely associated with age than other tests. Sample of 2,500 men used - 100 at each age from 18-42. Scores were found to decline gradually with age from average of 40 to just over 30. Only about 5.81% of total variance of scores due to age differences. Remainder due to differences within each group. Rectilinear regression accounts for 3.52% and Polynomial equation of 3rd order for additional 0.65%. As sample is large, this increase can be shown to be significant but too small to abandon simple assumption of rectilinearity for general purposes.

SLATER, Patrick. Comment on 'The Comparative Assessment of Intellectual Ability'. Brit. J. Psychol. (1948). 39: 20-1.

Evidence is presented which the author feels casts doubt on the conclusion which Raven arrived at in his paper (Brit. J. Psych. 1948., p.12-19) to the effect that the distribution of intelligence at maturity is not normal.

C. SLATER, Patrick. Scores of Different Types of Neurotics on Tests of Intelligence. Brit. J. Psychol. 1945. 35: 40-2.

Obsessionals, men with miscellaneous neuroses, anxiety states and hysterics (25 men in each group) were tested with Progressive Matrices, Cattell IIA and IIB and the Shipley

Vocabulary Test. It was found that men suffering from obsessional neurosis tended to be more intelligent than those suffering from other neuroses, but there were no significant differences between the other groups. Thus it is demonstrated that neurotics are heterogeneous as regards intelligence.

- E. SLATER, Patrick and BENNETT, Elizabeth. The Development of Spatial Judgment and its Relation to some Educational Problems. *Occip. Psychol.* 1943. 17: 139-55.

Seven pencil and paper tests, used for measuring spatial judgement have failed to discriminate any ability other than general intelligence among two large groups of children chosen to be representative of the population attending publicly financed schools at the age of 11+ and 13+ respectively. The type of educational programme which is most appropriate to individual development is briefly described.

- C. SMITH, Jean P. and FINK, S.L. The Relationship Between Physical Improvement and Psychological Factors in Chronically-Ill Patients. *J. Clin. Psychol.* 1963. 19, 289-292.

This study examined the degree to which the psychological variables of orientation, intelligence, personal adjustment, social adjustment and motivation relate to improvement or decline in physical mobility and independence. C.P.M. scores tended to be low for the left and right hemiplegics and high for fracture and arthritic cases.

- A. SOROKIN, Boris. Standardization and Analysis of Progressive Matrices Test by Penrose and Raven. Unpub. Report, Zagreb, Yugoslavia. 1954.

An analysis of the Progressive Matrices (1938) results of a random sample of 299 Zagreb school children aged 13.6 to 16.6 for use as a standardization of the test for a vocational guidance centre. The results are negatively skewed for this group, the mean 37.2 (S.D. 11.3). Test reliability (split half method) is 0.96 and retest reliability (after six months) 0.82. The results include an item analysis showing a lack of discrimination by C12, E7, E8 and E12. The best item is D4.

- SPEARMAN, C.E. Measurement of Intelligence. *Scientia*, 1938, 64, 75-82.

Discussion of the concept of 'g' as a factor which enters into all cognitive performance. It measures an activity called 'eduction' which consists in passing either from 2 items to their interrelation or from one item and a relation to the correlative item. Success has been achieved in measuring 'g' through the test devised by Penrose and Raven.

- SRIVASTAVA, A.K. An investigation into the factors related to educational underachievement. Ph.D. Thesis, Patna University. 1967.

STINISSEN, J. De Waarde van de Progressive Matrices '38, Een Nieuwe vorm voor de Lagere School. (Value of Progressive Matrices 1938; a new form for the elementary school) Tijdschr. Studie and Beroepsorient 1956, 3, 106-124.

This article gives a survey of studies made on the quantitative aspects of the PM., especially on account of its reliability, validity and item analysis. These aspects together with time limits, distributions and norms have been studied on a group of 509 Dutch speaking children of Belgium taken from 27 classes in 14 elementary schools.

- E. STRUHS, Isabel. The Relation Between the Raven Progressive Matrices Test and the Stanford-Binet in a Group of Gifted Children. Master's thesis, Fordham University (New York, N.Y.) 1956.

- A. SULLIVAN, Arthur. Measurement of Intelligence in Different Environments. B. Maritime Psychol. Ass. 1957. 6:18-23.

Groups of 15 to 16 year old school children from 2 cities and a region of isolated settlements in Newfoundland were compared for performance on two tests of intellectual ability. The hypothesis that an inferiority of I.Q. in the isolated regions would be found on Wechsler-Bellevue Form I (which stresses numerical & verbal abilities) but would not be found on PM test was verified by the results. Correlation between the tests was low for city groups but fairly high (.719) for the isolated region group.

- C. SUTTER, J.M., LUCCIONI, H. AND SCOTTO, J.C. Valeur des méthodes de mesure de l'intelligence: A propos d'une enquête menée chez des schizophrènes. Annales Medico-Psychologiques. 1969. 2, 439.

Summary of a paper delivered in Marseilles in which the authors comment on a discordance in results obtained from a group of 28 stabilised schizophrenics, when given the Wechsler-Bellevue, the Binet-Pichot and the S.P.M. They argue that there is no contradiction in the results, but that each test measures different aspects of intelligence and should ideally therefore be used together. (Summary in French).

- E. SWINNEN, K. Een onderzoek met de Progressive Matrices '38 op een groep leerlingen van de zesde latijnse en zesde moderne. Tijdschr. Studie and Beroepsorient. 1958. 5. 13-25.

S.P.M. given to 180 boys, aged 12-13 years, doing an arts course. Predictive validity relating to scholastic attainment in first two years was .537 (Greek and Latin group) and .21 (Modern languages). Reliability was .85 and with correction for homogeneity this rose to .95.

- C. SYDIAHA, Daniel. Prediction of W.A.I.S. I.Q. for Psychiatric Patients Using the Ammons' F.R.P.V. and Raven's Progressive Matrices. Psych. Reports. 1967. 20 (3) 823-826.

40 patients at a psychiatric hospital were tested with the following tests of intelligence: W.A.I.S., P.M. and Forms A & B of the Full-Range Picture Vocabulary Test (FRPV). Regression analysis using W.A.I.S. as the criterion and the other two tests as predictors indicated that either Form A or Form B of the F.R.P.V. predicted W.A.I.S. I.Q. but the P.M. did not.

- C. SYDOW, Donald W. A Psychometric Differentiation Between Functional Psychotics and Non-Psychotics With Organic Brain Damage. Doctor's thesis, Uni. of Minnesota. (Minneapolis, Minnesota).
- C. TAIBL, Raymond Martin. An investigation of Raven's "Progressive Matrices" as a tool for the psychological evaluation of cerebral palsied children. Doctoral Thesis, University of Nebraska, 1951.

Of 115 unselected cerebral palsied subjects who attempted the SPM, all but 1 completed it. Their performance was not significantly different from N. American children of similar age. The athetoid subjects were no different from normals, but the spastic group was significantly different from the athetoid group. A correlation of .715 was found with the Stanford-Binet for those subjects who performed on both tests.

- C. TIZARD, J., O'CONNOR, N. AND CRAWFORD, J.M. The Abilities of Adolescent and Adult High Grade Male Defectives. J. Mental Sci. 1950. 96:888-907.

The Heath rail walking test, five intelligence tests and 12 subtests of the U.S.E.S. general aptitude battery were administered to 104 defectives, mean C.A. 20.9. Wide differences in standard deviations of test results show the invalidity of inferring defect from S.D.'s - especially on the Binet type vocabulary tests. On spatial ability this sample was one S.D. below mean of normal adults, on form perception $1\frac{1}{2}$ S.D. below, on finger and manual dexterity 2 S.D. below, on motor speed $2\frac{1}{2}$ S.D. below. At least 34% of the sample could be regarded as suitable for certain jobs falling under the categories apparently tested by the U.S.E.S. battery.

- A.E. TORRANCE, E.P. AND JOHNSON, R.T. Gifted Thirteen Year Olds in Two Cultures: Greater London and Greater Twin Cities (U.S.A.). Gifted Child Quarterly. 1966. 10 (3) 125-131.

Mathematics achievement was investigated in 62 intellectually gifted American 13-year olds, and a similar number of gifted English children, the criterion for giftedness being a score of 55 or better on P.M. On the Co-operative Sequential Tests of Educational Progress in Mathematics, the American students had a mean score of 41.12, the English 40.24: the difference

was not significant. When questionnaire responses were examined regarding the reported time in outside study spent on mathematics, the American subjects mean was 10 hr/weekly and the English mean 2 hr./weekly. This difference was significant at the .001 level.

- C. TRACHT, Vernon S. Preliminary Findings on Testing the Cerebral Palsied with Raven's Progressive Matrices. J. Except. Child. 1948. 15:77-89.

A number of cerebral palsied children and adults were given Raven's Progressive Matrices, a nonverbal test of mental ability. Results showed this test is particularly suited to persons so handicapped.

- C. TRACHT, Vernon Sloan. A Comparative Study of Cerebral Palsied and Normal Adults on Two Forms of Raven's "Progressive Matrices". Doctoral Thesis, Loyola University, Chicago, 1958.

No significant differences were found between a group of cerebral palsied adults and a group of normal adults on either the booklet or the block form of the SPM. A very significant difference was found between the two groups (normal and palsied) in the time taken to complete the booklet form of SPM. This would strongly indicate that the time element is an important factor to consider in evaluating the overall findings of this study and the test results of cerebral palsied persons in general, whether children or adults.

- A.E. TULKIN, S.R. AND NEWEROUGH, J.R. Social Class, Race and Sex Differences on the Raven (1956) Standard Progressive Matrices. J. Consult. Clin. Psychol. 1968. 32, 4, 400-406.

Standard P.M. was administered to 356 5th and 6th grade subjects to determine effects of past experiences related to race, social class and sex. All social class differences were significant while a racial difference was found only in the lower class. No sex differences were significant. Relationships between the Matrices and other measures (both standard test and family experiences) varied among the different race, class and sex groups. Future research must consider race, class and sex in its investigation of the usefulness of Matrices, and more generally experimental influence on intelligence and school achievements.

TULLY, G.E. Test-retest reliability of the Raven Progressive Matrices Test (Form 1938) and the California Test of Mental Maturity, Level 4 (S-F 1963). Florida Journal of Educational Research, 1967, 9, 67-74.

- C. URMER, Albert H., MORRIS, Ann B, and WENDLAND, Leonard V. The Effect of Brain Damage on Raven's Progressive Matrices. J. Clin. Psychol. 1960 16: 182-5.

Two groups, one control and one with a diagnosis of cerebro-vascular accident, were compared on W.A.I.S. and P.M. Results indicated that brain damaged subjects perform qualitatively as well as quantitatively poorer on P.M. than control subjects. Total P.M. performance for brain damaged is depressed beyond any intellectual depression reflected in W.A.I.S. Qualitative changes are reflected by C.V.A. group being less consistent in responding to item difficulty as well as making figure ground reversal errors. Can be generally concluded that use of instruments which cease testing after a specified number of failures would penalise brain damaged individuals excessively.

- A. VALENTINE, Max. Psychometric Testing in Iran. J. Ment. Sci. 1959. 105: 93-107.

Intelligence scores on P.M. are lower in Iranian school and university populations than the expected norms and especially in nonwesternised groups. It is believed this is due to lack of training in perceptual analysis and logical reasoning. Traditionally there is a trend to speculative theorizing and this tendency is confirmed by results of "values" tests.

VANHOVE, A. and VERDONCK, P. J.C. Raven's Progressive Matrices '38 als Kwalitatieve Intelligentie Test. Tijdschr. Studie and Beroepsorient, 1955, 2, 61-79.

VEJLESKOV, H. An Analysis of Raven Matrix Responses in Fifth Grade Children. Scand. J. Psychol. 1968. 9. 177-186.

Performances of 628 children on the Standard Progressive Matrices were studied by means of the average score in the five series of the test as well as by the time used for the whole test. The analysis considered differences with regard to sex, age and socioeconomic

status. Further, the individual items of the test were analysed with regard to the order of presentation and sex differences of response frequencies. Finally, the nature of the test and the application of a stochastic model are discussed.

V. VERNON, P.E. The Reliability and Validity of the Progressive Matrices Test. Admiralty Report. 14b. 1942

Correlations of the Matrices with good criteria of proficiency in various occupational groups of the Forces. Although other tests show a higher validity for specific jobs, the Matrices is the best single measure of the general ability which underlies all types of jobs. The above result only considers trainability. In ultimate efficiency, e.g. battle conditions, little is known. It was found, however, in a group of A.R.P. rescue men, that Matrices ability is still an asset, but that the ability measured by a vocabulary test is of little or no advantage. In factor content, the Matrices has the highest 'g' saturation, a very small amount of 'k' factor, but no verbal educational factor. Its main weakness is its rather poor consistency compared with most group tests of ability - i.e. the test performance is dependent on non-intellectual factors. The reliability of the Matrices test was assessed by comparing scores with the T_2 total. The number of divergencies seem insignificant.

VERNON, P.E. Psychological Tests in the Royal Navy, Army and A.T.S. Occup. Psychol. April, 1947. 1-22.

A review of psychological tests used in personnel selection during the war by the Royal Navy, Army and A.T.S. The Progressive Matrices is somewhat disappointing for vocational purposes, perhaps because: (1) the Services wanted intelligence and education rather than pure intelligence alone; (2) a battery of verbal and mechanical spatial tests yielded a better combined result than the Matrices alone, only when its visuo-spatial component was involved, did it seem to have anything to add to such a battery; (3) the main reason is its rather poor reliability and its susceptibility to nonintellectual influences - as Roberts has shown, this is greatest in the 15-30 score range, which is just about the level where acceptance or rejection for the Services takes place.

- V. VERNON, P.E. The variations of Intelligence with Occupation, Age and Locality. J. Stat. Psychol. October, 1947. 52-63.

The Matrices scores of 89,764 Royal Navy candidates are tabulated under occupation, age and area of Great Britain categories. All factors other than individual occupation and age differences are relatively unimportant although statistically significant. Support is found for the suggestion that men in unskilled and labouring occupations tend to lose the mental capacities they possessed when they left school, and that men who make use of their intelligence retain it the best.

- N.V. VERNON, Philip E. Occupational Norms for the 20 Minute Progressive Matrices Test. Occupational Psychol. 1949. 23:58-9.

Norms are given based on 89,764 men in different occupations and age groups.

- V. VERNON, P.E. The Structure of Practical Abilities. Occupational Psychol. 1949. 23:81-96.

A review of approximately 100 unpublished factor analyses indicates that the major part of the variance of a miscellaneous battery of psychological tests may be attributed to g, in addition, abilities fall into two main groups, the v:cd: and k:m and these major group factors can be further subdivided into specialised factors. It appears justifiable to make the fullest possible use of g, k:m and ed tests for guidance purposes, but experience and attitudes need also to be considered.

- VERNON, P.E. An Application of Factorial Analysis to the Study of Test Items. Brit. J. Psychol. Stat. Sect. 1950. 3:1-15.

Application of factor analysis to a set of test items will show whether content of test is homogenous or whether different items measure largely distinct abilities. Suggested that the general factor running through all items should be at least four times the variance of all significant bipolar factors if test is to be regarded as adequately homogenous. Heterogeneity and formal factors constitute a serious problem as shown by the nonlinear regressions frequently noted in following up Army and Navy tests

during the war. If formal content varies significantly in a test given with time limits, items should be thoroughly mixed and presented in approximate order of difficulty, other different levels of scores will measure different combinations of abilities. Formulae and tables are included.

- V. VERNON, P.E. AND PARRY, J.B. Personnel Selection in the British Forces. London. University of London Press Ltd. 1949.

This is an account of procedures used and results obtained from application of scientific methods to personnel selection in British Forces during W.W.II. Part I is concerned with "the organisation of selection, the general procedures employed and the work of psychologists in the Royal Navy, Army and A.T.S., and the Royal Air Force. Part II is concerned with "the principles of personnel selection and guidance which have evolved both from pre-war investigations and from war time experience". Conclusions relevant to civilian psychology are contained in final chapter. An appendix lists main psychological tests used in forces.

- WALTER, W. Grey. Brain Responses to Semantic Stimuli
J. Psychosom. Res. 1965. 9. 51-61.

The probabilistic relation between stimulus association and anterior brain responses has been demonstrated and the development of the Contingent Negative Variation or "Expectancy Wave" has been found to follow very closely alterations in the significance of conditional stimuli. The inclusion of some response by the S. is essential but this does not have to be motor; in Several Ss a purely mental event, amounting to a simple decision, was adequate to sustain an E-wave. Results of using patterns taken from S.P.M. are reported.

- C. WALTON, D. The Validity and Interchangeability of Terman-Merrill and Matrices Test Data. Brit. J. Ed. Psychol. 1955. 25:190-4.

Present experiment was designed to discover reasons for large discrepancies noted in routine testing of approved school boys between results of Terman Merrill and P.M. tests. Results from 360 intermediate approved school boys, tested individually with Terman-Merrill Form M, and in groups with P.M. (1938) were

compared with those from a clinic group of 301 children who had been tested individually with Matrices 1938 and Terman Merrill. When the two tests are administered individually, results show closer agreement than when Matrices is administered in group form. Reasons are suggested, e.g. children with personality problems react better to individual testing and so results are more valid. Discussion of results centres on lower Matrices grades, equivalence, administrative errors and the effects of giving the test individually.

WETHERICK, N.E. The Responses of Normal Adult Subjects to the Matrices Test. Brit. J. Psychol. 1966. 57 (3-4). 297-300.

Bromley (1963) drew attention to what he called "primitive forms of response to the matrices test" in his study with 35 hospitalised psychiatric patients between 40 and 80 years. His subjects consistently chose responses other than the correct one, making it appear they were using a consistent but incorrect method of solution - a primitive thought process. This was tested to see if it applied to normal subjects. Sample of 236 subjects from 20-69 and sample was above average in intelligence. If only relative difficulty of matrices and frequency with which particular wrong answers were selected, it appears results of Bromley's sample are typical of a normal population. Their choice of wrong responses was not due to age or mental abnormality except where either causes reduction in level of intelligence. Tables of results are given.

WETHERICK, N.E. Structure and Content in Concept Attainment. Effects of Varying Problem Content. Brit. J. Psychol. 1967. 58. 223-226.

Three equivalent forms of a concept-attainment task were employed on the hypothesis that both unfamiliar problem content and relatively familiar problem content would have the effect of reducing the efficiency with which problems were solved by comparison with neutral problem content. Assessment of nonverbal intelligence was with the SPM, with a time-limit of 15 minutes. The scores obtained must obviously not be regarded as adequate measures, but they do permit the subjects to be ranked.

- A. WILTSHIRE, E.B. and GRAY, J.E. Draw-a-Man and Raven's Progressive Matrices (1938) Intelligence Test Performance of Reserve Indian Children. Canad. J. Behav. Sci. 1969. 1 (2) 119-122.

86 Canadian reserve Indian Children from 7-15 years were tested on the Harris-Goodenough Draw-a-Man and Raven's Progressive Matrices (1938) tests. The Raven mean I.Q.s were: girls 79, boys 85, not significantly different. The tests were significantly correlated (raw scores $r=0.67$; I.Q.'s $r=0.53$). Older children had significantly lower I.Q.'s on the Raven only. These results caution against assuming that these tests, especially the Raven (1938) are "culture free" measures of intelligence.

WŁODARSKI, Ziemowit Błędy w rozpoznawaniu figure geometrycznych. ("Errors in distinguishing Geometrical Figures"). Przegląd Psychologiczny. 1960. 4. 89-99.

Results with 25 adults investigating the regularities in distinguishing geometrical figures showed (a) uneven increase by leaps of difficulty in distinguishing geometrical figures results from the gradual increase of the number of the distinctive features.

(b) a great difference between difficulty with 5 distinctive features and those with 6 features.

(c) a peculiar ease in the arising of disturbances in distinguishing figures according to their size.

(d) increase in the frequency of time errors in discerning figures, following the gradual complicating of the problem, even those that are quantitatively immeasurable.

(e) a lack of correlation between ease in discerning geometrical figures and results obtained on S.P.M. (Text in Polish, English summary).

WOLF, Willavene Sheets. The Contribution of Speed of Response in Mental Measurement. Doctor's Thesis, State University of Iowa, (Iowa City, Iowa) 1960.

Purpose was to investigate contribution of speed of response in intelligence tests to prediction of academic achievement and to attempt to improve predictive powers of PM and Leiter International Performance Scale by making time a part of the score. Tests given to a group of 5th grade school children. Hypotheses of study seemed to be supported as speed of response, when combined with number of right scores on PM and Leiter Scale scores increases correlation between these tests & Iowa test of basic skills (ITBS) and Lorge-Thorndike Test scores. However, correlations also showed that Raven and Leiter tests used here are not good predictive instruments. Assumption that speed of response would contribute to predictive value of test was borne out. Average time scores on items successfully completed correlated with criterion to almost same extent as number right scores.

WOLF, Willavene and STROUD, James B. The Contribution of Response in Mental Measurement. J. Ed. Psychol. 1961. 52:249-53.

To investigate speed of response as a factor in mental measurement, P.M. and Leiter International Performance Scale were administered to individual

sessions of 102 5th grade pupils and a time score determined for each pupil. Utilisation of the time values together with the conventional scores resulted in correlations between the two tests in question (P.M. & Leiter) and the two criterion tests, Iowa tests of basic skills and Lorge Thorndike, significantly higher than correlations obtained between the conventional scores alone and the two criterion tests. Further analysis of P.M. data of each 4th of items suggested that contribution of the time values increased from 4th to 4th of the items and thus with difficulty, through the 3rd 4th. Results imply that person who is able to deal more quickly with intelligence test items has more ability than the slower but equally accurate individual.

- C. WOODSIDE, Moya. Instability in Women Prisoners. Lancet. 1962. Nov. 3, pp. 928-930.


A series of 139 women admitted to Holloway Prison between May 1st and October 31st, 1961, with sentences of 6/12 or longer, were interviewed and their records studied. 58 had a positive history of psychiatric disorder and evidence of instability was found in another ten. Social disorganisation, as manifest by irregular unions and illegitimate maternities was frequently concomitant with delinquency. Intellectually, there was a slight skew towards the lower grades.

- E. WRIGHT, R. The abstract reasoning of deaf college students. Unpub. Doctoral dissertation. Northwestern U. Evanston, Ill. 1955.

For published reference to this material see:
Goetzinger, Wills and Dekker. 1967, p. 501.

- C. WYSOCKI, Boleslaw A. Assessment of Intelligence Level by the Rorschach Test as Compared with Objective Tests. J. Ed. Psychol. 1957. 48: 113-7.

An attempt was made to determine validity of the group Rorschach in assessing level of intelligence. Group Rorschach results were compared with verbal SP Test 15, (British Army), and nonverbal (P.M.) intelligence tests for men and women separately. Significant correlations from .272 to .450 were



found for Rorschach categories of: total number of responses, percentage of whole responses, percentage of human movement of responses, good form per cent, and percentage of animal responses. Correlations between poor form level and intelligence tests were not significant when calculated for men and women separately. Using a correlation matrix for men and women together, several corrected multiple correlations were calculated. Following Rorschach categories were best combination of scores for predicting level of "intelligence": number of responses, human movement, good form and animal responses.

- A. WYSOCKI, Boleslaw A. and CANKARDAS, Aydin. A New Estimate of Polish Intelligence. J. Ed. Psychol. 1957. 48:525-33.

Aim was to produce recent and valid data on intelligence of Poles. Sample of almost 16,000 adults used, representing all classes and parts of Poland. P.M. (1938) used. Test results subjected to percentage analysis according to different military assignments educational levels, ages and occupational backgrounds. P.M. ranked various Polish groups in about same order as for similar English groups and assigned scores numerically comparable to corresponding English scores (and to scores of other intelligence tests in G.B. and U.S.A.) for comparable groups. Results show marked differences in intelligence levels of different groups caused by different factors, e.g. education, occupation, rural or industrial environment of age levels similar to those in intelligence testing of English speaking subjects.

- A.E. YOUNG, Harben Boutourline, TAGIURI, Renato, TESI, Gino and MONTEMAGNI, Gabriella. Influence of Town and Country Upon Children's Intelligence. Brit. J. Ed. Psychol. 1962. 32:151-E.

The results of a relatively culture free intelligence test (P.M. 1956) applied to a random sample of 5th grade elementary school classes in Florence area (Italy) showed a marked superiority of town boys over boys from the country. This superiority remained significant for socioeconomic classes 4 & 5 after differences in social class distribution had been controlled. However, no differences between urban and rural girls were found. Possible explanations of the results are discussed and the importance of further enquiry is emphasised.

- C. ZANGWILL, O.L. "Intelligence in Aphasia" in Rueck, A.V.S. and O'CONNOR, M. (Eds.) Disorders of Language. Ciba Foundation Symposium, Little, Brown & Co. Boston, Mass. 1964.

Performance on the Progressive Matrices test is not grossly impaired in motor aphasia, in jargon apraxia, or in amnesic aphasia, except in cases in which the speech disorder is associated with constructional apraxia.

3.1

3. Coloured Progressive Matrices (CPM) only

- E. ALLEBACH, Nancy L. Raven's Coloured Matrices and Tests of Primary Mental Abilities with Young Children. Master's thesis, Pennsylvania State University. (State College, Pa.) 1954.
- V. ANDERSON, R.P. Modification of the Raven Progressive Matrices for the Blind. Unpub. progress report, Project. 670-61-1. U.S. Office of Vocational Rehabilitation, 1961.
- C.N. ANDERSON, Harry E., KERN, Frank E. and COOK, Charlotte. Correlational and Normative Data for the Progressive Matrices with Retarded Populations. J. Psychology 1967. 67 (2) 221-225.

Available data on 107 and 151 vocational and rehabilitation students were used to obtain correlational and normative information respectively. Information available included CPM, WAIS, & WRAT (Wide Range Achievement Test), scores with age and attained school grade level. Low to moderate correlations were found between grade level, intelligence and achievement variables. Substantial correlations were found between the sets of the CPM, between Wais V and WAIS-P (word recognition) and Arithmetic. CPM-WAIS correlations were higher with WAIS-P than with WAIS-V but actual proportion variance overlap ranged from .11 to .25. Normative data indicated that Set A of the CPM is least difficult and Set B most difficult. All score distributions were skewed negatively and the CPM total score distribution appeared best for determining individual differences.

- C. ANDERSON, Harry E., KERN, Frank E., and COOK, Charlotte. Sex, Brain Damage and Race Effects in the Progressive Matrices with Retarded Populations. J. Soc. Psychol. 1968. 76. 207-211.

A sample of 147 educationally or mentally retarded persons were administered the CPM, the WAIS and the WRAT. Persons were classified on the basis of race, sex and brain damage. Race differences were found in WAIS V and the WRAT - WR while brain damage differences were determined in the WAIS - P, CPM total score and SPM - AB. The brain damage differences in the CPM - Ab test could not be attributed to varying achievement and intelligence levels.

- J. ARCHIBALD, Y.M., WEPMAN, J.M. and JONES, L.V. Nonverbal Cognitive Performance in Aphasic and Nonaphasic Brain-damaged Subjects. Cortex. 1967. 3 (3) 275-294.
Examined performance of "aphasic patients on nonverbal cognitive tests" to determine if such performance is impaired by language disorder and whether performance on four tests used is affected differentially in attempt to relate severity of aphasia to degree of impairment in cognitive performance. 39 left and 32 right brain damaged patients with mainly cerebral vascular accidents were tested with Language Modality Test for Aphasia, Raven's Progressive Matrices, Shure-Wepman Concept Shift Test, Grassi Block Design Test and the Elithorn Mazes. Results show that more severe aphasic patients are impaired in their cognitive performance...(Aphasia) is specifically a defect of language and memory for language which may or may not be accompanied by impaired cognitive functioning ...the scores of right brain damaged patients are markedly inferior to those of the left brain damaged patients who were able to do this task.
- C. ARRIGONI, G. and DE RENZI, E. Constructional Apraxia and the Hemispheric Locus of Lesion. Cortex. 1964. 1. 170-197.
Three groups of left brain damaged patients, N=70, right brain damaged patients, N=55, and control patients, N=50, were given a battery of constructive tasks.... Dyspraxic subjects were identified, taking as cut off point score obtained by normal subject with worst performance. All three tests indicated that constructive apraxis is significantly more frequent among right brain damaged patients. Severity of disturbance was not significantly different between the two hemispheric groups but certain qualitative differences were noted...When examined with a battery of intelligence tests dyspraxics proved to be more impaired than nondyspraxics, both in performance and verbal tasks; left brain damaged patients did worse than right brain patients on WB Verbal scale and on Raven's PM, no difference between the two hemispheric groups was found on W-B performance Scale.
- A. BERLIOZ, L. Etude des Progressive Matrices faite sur les Africains de Douala. Bulletin du Centre d'Etudes et Recherches Psychotechniques. 1955. 4. 33-44.
J.C. Raven's test of Progressive Matrices 1947 (Series A, Ab, B,) has been used on a sample of 80 African specialised workmen (however rudimentary their specialisation) of the Public Road Service of Douala (Cameroon), and the distribution of the erroneous answers permits the subdivision of the test in two groups of heterogeneous items.

3.3

- A. BERRY, J.W. Temne and Eskimo Perceptual Skills. Int. J. Psychol. 1966. 1. 207-229.

The results of the study support the view that 'culture free' tests are unattainable: since people with differing cultures and ecologies tend to develop and maintain different sets of skills, then the concept of intelligence, or its equivalent is bound to be defined somewhat differently in each society. It follows from this that the search for a culture free test is futile insofar as it is hoped to find a universally valid test: although some tests might be used with fairness in a limited number of societies, this still leaves us with the problem of comparing the results between these 'test-fair' units.

- A. BERRY, J.W. Ecological and cultural factors in spatial perceptual development. Canad. J. of Behav. Sci. 1971, 3 (4), 324-336.

Subjects from 8 subsistence level samples (e.g. Sierra Leone and Scotland) were given Kohs Block Design Test, a 6-item form of the Embedded Figures Test and Matrices. Results support a proposed model of spatial perceptual development. Age and sex differences were considered.

- N. BRUNI, R. Working Percentiles based on 931 Italian Children. Personal Communication. 1954.

Progressive Matrices (1947) Sets A, Ab, B - Results and working percentile points are given of 931 children aged 8-11 years (463 boys, 468 girls) from primary Italian schools.

- C. CACERES, A. and MAURTUA, N. A proposito de las pruebas de inteligencia y la afasia. (On Intelligence tests and Aphasia). Revista de Neuropsiquiatria. 1968. 31 (2) 111, 121.

Sixteen 67 year old male and female in and out patients diagnosed as expressive, global and mixed aphasia, (88% from low socioeconomic levels and 84% with little education) were given several nonverbal tests: (1) the Human Figure Test in which 36% of subjects produced adequate representations; (2) the Bender Visual Motor Gestalt Test in which 28% of subjects revealed motor conservation tendencies and (3) PM in which 48% of subjects were considered mentally deficient. Need to account for other factors, etiology of illness, duration of development retraining methods, socio-economic antecedents etc.) was stressed.

- E. CANTWELL, Zita M. The Performance of American Pupils on the Coloured Progressive Matrices. Brit. J. Educ. Psychol. 1967. 37 (3) 389-390.

727 elementary school students from a stable white Neighbourhood (school I) were compared to 807 students

from an unstable, primarily Negro neighbourhood (school II) on the Coloured Progressive Matrices. School I subjects had a higher performance level than School II subjects. Within each group, boys achieved higher mean scores than the girls.

- E. CAROTENUTO, Vincenzo. Esami psico-attitudinali agli studenti dell'Universita di Napoli nell'anno 1964-65. (Psychoattitudinal Examinations of the University of Naples students in 1964-65). Bolletino di Psicologia Applicata. 1967. 79-82, 101-119.
- C. CASHDAN, A. Problem-solving and Learning Sets in Normals and Sub-Normals. Bull. B.P.S. 1962. 46, 2A.

This study was designed to determine whether sub-normals would achieve better scores on CPM if required to make use of the verbal system, by having to justify their solutions. Two types of administration were used: the standard and the experimental (or 'verbal explanations'). No differences according to the type of administration were found either between groups or within groups.

- CHEYNE, W.M. and JAHODA, G. Emotional sensitivity and intelligence in children from orphanages and normal homes. J. Child. Psychol. Psychiat. 1971, 12, 77-99.

Eighty orphanage children, 6-10 years old were matched with children in normal homes and tested for recognition of emotion in speech. Matching included use of CPM, with subgroup means at or below the 25th percentile level. The samples were predominantly children of unskilled manual workers. Recognition scores correlated with both verbal and non-verbal ability and correlations decreased with age.

- C. COSTA, L.D., VAUGHAN, H.G., HORWITZ, M. and RITTER, W. Patterns of Behavioural Deficit Associated with Visual Spatial Neglect. Cortex. 1969. 5. 242-263.

Visual-spatial neglect as measured by an empirically derived response position preference score on the Raven CPM was examined in 70 patients with cerebral lesions and 63 controls. Patients with right cerebral lesions showed poorer CPM performance and a higher incidence of response position preference for the side ipsilateral to their lesions than did patients with left lesions. Position preference was significantly associated with homonymous visual field defects, constructional dyspraxia and in patients with left cerebral lesions mixed or receptive aphasia.

- C. COSTELLO, C.J. Aphasic Cerebral Palsied Children's Wrong Answers on Raven's Progressive Matrices. J. Clin. Psychol. 1959. 15: 76-7.

Data are presented showing differences in the frequency with which a particular type of wrong answer on the Progressive Matrices is chosen by a group of cerebral palsied children with aphasia or related disturbances and a control group of post-polio children.

- CURR, W., and GOURLAY, N. Differences Between Testers in Terman-Merrill Testing. Brit. J. Stat. Psychol. 1956. 9: 75-81.

Purpose was to compare size of mean and random errors made by trained and untrained Terman-Merrill testers. Eight professional psychologists and ten members of a psychology course tested random samples of pupils CA 8-9. Two testings with half sample tested by each at first testing and then interchanged three months later. Pupils also tested with Simplex Junior and Raven's Matrices about two months after first testing. Analysis of variance showed overall variance between tests barely significant at 5% level. Study made of relation between means of I.Q.'s and mean scores in Simplex and Matrices tests, but relation was not sufficiently linear to indicate which testers were testing high or low. Equivalence lines used to derive a set of norms for simplex and matrices tests and for Terman-Merrill vocabulary test at age level of testees.

- E. DENMARK, F.G.W. An investigation of some problems in the education of partially deaf children. M.A. Thesis, University of Liverpool, 1953.
- C. DILS, Charles W. The Coloured Progressive Matrices as an Indicator of Brain Damage. J. Clin. Psychol. 1960. 16: 414-6.

CPM protocols of 60 organic subjects were compared with those of 60 nonorganic controls. Equal proportion of each group were selected from a mental hospital and from medical patients in a long term hospital. Subjects with functional psychoses and idiopathic mental deficiency were excluded and the groups were controlled for factors of age, education, sex and race. A special scoring system was devised that correctly identified 82% of the organics and 92% of the controls. CPM shows promise of being a valuable instrument in the detection of brain damage, but the results of additional studies should be awaited before this technique is applied to general clinical use.

- E. DUPONT, J.B. Correlations entre certain tests mentaux et réussite en lecture au debut de la scolarite obligatoire. (Correlations between certain mental tests and success in reading at the beginning of compulsory schooling). *Enfance*. 1967. 3-4, 299-312.

All pupils in the first two grades of two Swiss cities were given five tests, the results of which were compared with teachers' ratings. The tests were Verbal Mosaic, Raven's Progressive Matrices, Fay Test, Copying Pictures and Copying Designs. Validity is related to the method of instruction. The results involving the copying of Designs are considered especially noteworthy.

- E. EVANS, L. A comparative study of the Wechsler Intelligence Scale for Children (Performance) and Raven's Progressive Matrices with deaf children. *Teacher of the Deaf*, 1966. 64, 76-82.

- C. EVANS, R.B. and MARMORSTON, J. Psychological Test Signs of Brain Damage in Cerebral Thrombosis. *Psych. Rep.* 1963. 12: 915-30.

Study was made of 204 patients between 40 and 80 years: 108 had had a cerebral thrombosis and thus known to have damage to brain and 96 had had a myocardial infarction but no known brain damage. Two groups were compared on Rorschach, Proverb Interpretations, Draw-a-Man, Bender-Gestalt, Raven Coloured Matrices and WAIS Digit Span and Vocabulary Tests. Each test distinguished successfully between cerebral and cardiac patients; each test divided at its optimum point, correctly classified more patients than could be expected by chance; a significant association between diagnosis and scores on each test was shown by contingency coefficients; positive relationships between every test (except Digit Span which was not calculated) and such of the other tests was shown by Spearman rank correlation ranging from .39 - .81. In view of the number of patients misclassified concluded that none of the tests could be safely used by itself for individual diagnosis.

- C. EVANS, R.B. and MARMORSTON, J. Scoring Raven's Coloured Progressive Matrices to Differentiate Brain Damage. *J. Clin. Psychol.* 1964. 20 (3) 360-364.

CPM responses of 71 brain-damaged and 60 non-damaged patients were used to compare four methods of scoring that test: raw score, a consistency score, a scatter score and items reported as discriminating. The groups were controlled for factors of age (mean 59) education (mean 8.5), sex and race. Each of the four methods successfully differentiated the two groups; correctly classified more patients than could be expected by chance; was significantly related to diagnosis (cerebral

thrombosis vs. Myocardial infarction); and was positively related to each of the other scoring methods. At least with these older patients, the simple raw score was as useful as more elaborate scoring schemes.

- E. FISHER, B. The social and emotional adjustment of children with impaired hearing attending ordinary classes. M.Ed. Dissertation, University of Manchester, 1965.
- E. FOGELMAN, K.R. Modern Mathematics and Intelligence Tests. Educational Research. 1968. 11 (1) 71-73.

Investigated the effect on intelligence tests of previous experience with certain mathematical materials and topics. Five classes of 7-8 year old English children were given training for two terms with an apparatus designed to promote familiarity with the grouping of objects according to their attributes. Six classes of comparable children constituted the controls. Of those completing a picture test pretest as well as post tests consisting of the Lorge Thorndike Intelligence Test and P.M., experimental group (N=61) scored significantly higher than control group (N=86) on Lorge Thorndike test. On P.M., scores of experimental group were also higher but not significantly. It is emphasised that due to methodological weaknesses, including a different pretest and a small and possibly atypical sample, results should be interpreted cautiously. However, it is concluded that experience such as that given to the experimental group seems to improve scores on intelligence tests requiring skills similar to those fostered by this experience.

- FREYBURG, P.S. The Efficacy of the Coloured Progressive Matrices as a Group Test with Young Children. Brit. J. Educ. Psychol. 1966. 36. 171-177.

Coloured Progressive Matrices test has proved to be a useful nonverbal instrument apart from some doubts concerning its reliability. A pilot investigation gave reason for the belief that the test could be group administered with higher reliability than had hitherto been reported. The test was administered to 159 6-7 year olds, coefficients of internal consistency and stability being .89 and .87-.76 respectively. Relationship of Matrices scores with those obtained from other instruments are quoted, together with score distributions and directions for group administration with young children.

- E. FROST, Barry P. Anxiety and educational achievement. Brit. J. Educ. Psychol. 1968, 38 (3) 293-301.

This paper reports a study of the relations between anxiety and educational achievement in 310 11-year-old junior school pupils (170 boys, 140 girls). The instruments used were the Frost Self Description Questionnaire (which includes seven anxiety scales and a Denial scale), the Junior Eysenck Personality Inventory, Progressive Matrices, Crichton Vocabulary and three NFER tests of reading and arithmetic. Product-moment, additive multiple regression and Principal Components (with Varimax rotation) analyses are reported.

- C. GAINOTTI, Guido. Les manifestations de negligence et d'inattention pour l'hémispace. Cortex. 1968. 4, 64-92.

All the patients with unilateral brain damage admitted to our clinic during a 15 month period were given a battery of tests with the aim of detecting the possible existence of unilateral spatial agnosia. In the same patients, investigations were carried out to study somatosensory and visual field defects, general mental impairment, unilateral alterations of the body schema disturbances of eye movements and modifications of the personality. CPM was among the tests used. All tests indicated that ASU is significantly more frequent among right brain-damaged patients.

- C. GOETZINGER, M.R. and HOUCHINS, R.R. The 1947 Coloured Raven's Progressive Matrices with Deaf and Hearing Subjects. Amer. Annals of the Deaf. 1969. 114 (2) 95-101.

Forty deaf and 40 hearing children of elementary school age were administered Raven's 1947 Coloured Progressive Matrices. Comparisons between groups on the scores were conducted for CA, sex and method of directions (pantomime vs. verbal). With regard to questions posed and in terms of age levels studied (CA's of 6-1/2 to 8-1/2 years) it may be concluded: (1) That the deaf and the hearing do not differ significantly on this measure. (2) That sex is not a factor in performance of the deaf on this test. (3) That performance is not significantly affected by the medium of directions. (4) That hearing males appear to be superior to hearing females. Was hypothesised that this finding could reflect differences in experiences contingent on cultural influences rather than any innate differences in ability.

- 3.9
- N. GREEN, M.W. and EWERT, J.C. Normative Data on Progressive Matrices (1947). J. Consult. Psychol. 1955. 192, 139-142.

No significant difference was found between scores obtained by a slide form of administration compared with the book form. The median scores of the Rochester (U.S.A.) children are consistently higher than Raven's Dumfries figures. The overall correlation with age is high (0.55) also that with Otis Mental age (0.78). But correlation with three different standard group intelligence tests only moderate (average 0.40). The Matrices correlated more with verbal than nonverbal tests and therefore cannot be thought of as a test of nonverbal reasoning alone.

- E. HARRIS, Dale B. A Note on some Ability Correlates of the Raven Progressive Matrices (1947) in the Kindergarten. J. Ed. Psychol. 1959. 50: 228-9.

The intercorrelations of scores on the Raven Progressive Matrices (1947) the S.R.A. Primary Mental Abilities Test, and the Goodenough Draw-a-Man Test are presented. These are based on the individual testing of 984 kindergarten children selected to represent the urban population of the United States.

- E. HAZARI, Anandi. The Stability of Raven's Coloured Progressive Matrices Scores for Selected Children. J. Psychol. Research. 1960. 4: 102-4.

80 elementary school children with poor school records were given the Progressive Matrices. Two different analyses have been presented which demonstrate that scores on the Coloured Progressive Matrices are relatively stable for children with very poor scholastic achievements.

- A. HIGGINS, Conwell and SIVERS, Cathryne H. A Comparison of Stanford-Binet and Coloured Progressive Matrices I.Q.'s for Children with Low Socioeconomic Status. J. Consult. Psychol. 1958. 22: 465-8.

In group of 789 children of low socioeconomic status with age range 7-9 years 11 months, no evidence to support hypothesis that social biases in verbal items of SB depressed SB I.Q. below nonverbal, non-socially based, coloured Raven P.M. I.Q. Mean SB I.Q.'s were similar for Negro and white children boys and girls and for grouping within the three age levels. CRPM discriminated on basis of colour as negro mean scores were all lower than white means. No significant difference found for white children between SB IQ containing many verbal items and nonverbal CRPM IQ.

However, negro children's CRPM IQ means were significantly lower than SB means. Suggested that CRPM cannot be considered test of intelligence or measure of 'g' but a measure of a specific skill. Findings suggest intelligence tests heavily loaded with nonverbal items may discriminate against negro children.

- C.E. HINE, W.D. Adapted Performance Tests for Assessing the Cognitive Abilities of Cerebral Palsied Children with Impaired Hearing. Unpublished Progress Report. Dept. of Audiology and Education of the Deaf, U. of Manchester. 1969.

JACOBS, P.I. and VANDEVENTER, M. Progressive Matrices: an experimental, developmental, nonfactorial analysis. Percept. Mot. Skills, 1968, 27, 759-766.

The CPM appeared to confound 'pure' inductive ability with ability to imagine how a response alternative would look if inserted into the pattern. A new test format was developed to eliminate the role of the latter by having the S judge the correctness of already completed patterns. Dramatic increases in test score were found.

- JACOBS, P.I. and VANDEVENTER, M. Information in Wrong Responses. Psych. Rep. 1970. 26 (1) 311-315.

Under some circumstances the wrong responses a subject makes on a test may contain important information. In this study, the notion of facet design provided a systematic method for a priori ordering of the distractors on CPM as to degree of correctness. A score based on type of distractor chosen was shown to have a moderate degree of test retest reliability, concurrent and predictive validity, and cross-cultural applicability. The results suggest a re-examination of Sigel's finding that type of error and total score are unrelated.

- JAIN, K.S.P. An organismic Study of Cognitive Errors. Manas. 1964. 11 (2) 105 113.

In mental development, dominant errors in earlier stages are of perseveration and orientation type. In later stages, particularly in the age group of 5-6, distortion type is predominant, O and P types having been controlled. At higher stages of development, integration errors are dominant. This pattern of errors at different levels are explained by the principle of hierarchization of functions. Both on the P.M. and on the Bender-Gestalt, the marked difference in the groups was in the subordination of integration errors. The results serve the purpose of pointing out a method for comparing error patterns at two different levels of cognitive organisation.

JASPAR, J. Un test de calcul mental a l'ecole primaire, etude Psychometrique et genetique. (Mental calculation test at primary school, a psychometric genetic study.) Bulletin de Psychologie Scolaire et d'Orientation, 1970, Vol. 19 (4), 180-194.

In 2 studies on Raven's Progressive Matrices and the D48 Test, the general intelligence factor and non-verbal intelligence were analyzed to give a double dimension to the tests. A psychometric dimension, using the classic grading system, and a clinical dimension for the ascertaining of the genetic stage (synthetic operator, or formal) reached by the child. This 2nd test dimension makes it possible to reach the thought structure of the child besides the psychometric position in relation to the average.

- A. JENSEN, Arthur R. Statistical Note on Racial Differences in the Progressive Matrices. J. Consult Psychol. 1959. 23. 272.

Criticises an interpretation in article by Sperazzo and Wilkins (1958) - analysis of variance scores on P.M. Authors say measured differences in scores between races are related to age, sex and socioeconomic status of subjects, results cannot be interpreted as showing differences in intelligences in races tested here. Jensen says this interpretation is incorrect. Did an analysis of variance for all interactions and found race difference was highly significant statistically. Actual magnitude of race difference may be small even though difference is highly significant. Better to do analysis of variance on the three socioeconomic groups separately.

- C. JOHNSON, J.E. and OZIEL, L.J. An Item Analysis of the Raven CPM Test for Paranoid and Non-Paranoid Schizophrenic Patients. J. Clin. Psychol. 1970. 26, (3) 357-9.

An item analysis was made of the results of 200 mental hospital patients on the Raven CPM. Paranoid schizophrenic subjects did not differ from non-paranoid schizophrenic subjects in their performance on the test. The CPM may lack the discriminative power to be considered a valid measure of intellectual reasoning in schizophrenic subjects for this population.

JORDAN, Thomas E. The Utility of the Coloured Progressive Matrices. Doctor's thesis, Indiana University (Bloomington, Ind.) 1955.

JORDAN, Thomas E. Formboard Comparability in the Coloured Progressive Matrices. J. Clin. Psychol. 1959. 15: 422-3.

This study compared test scores on the booklet form of the Coloured Progressive Matrices with a new formboard version. The reliabilities of the two forms were comparable

and the difference between the mean raw scores of the two forms did not approach significance, so it is concluded that booklet and formboard versions are comparable. Both scales produced low correlation against Stanford-Binet scores.

JORDAN, Thomas E. and BENNETT, Carson M. An Item Analysis of the Coloured Progressive Matrices (1947). J. Consult. Psychol. 1957. 21: 222.

The Coloured Progressive Matrices was administered to 200 children entering first grade, using as an index of discrimination "the conventional upper and lower 27% technique". The item difficulties were determined by an item count of correct responses. One finding was that 25 of the 36 items on the Coloured Progressive Matrices "satisfactorily discriminate, but only 4 fall in the suggested difficulty range. 22 items appear to be too difficult for the age group studied. The data suggest that the test is of less value for lower age groups".

KENCHAVEERAIHAH, B. and MENON, A. Relationships of Intelligence and Fluency Among Students. Indian Psychol. Review. 1968. 4 (2) 123-125.

Cattell's test of Fluency and CPM were administered to 35 boys and 35 girls, 9-12 years of age. The picture test showed $r = .003$, Word Series, $r = .192$ and Completing forms $r = .503$ with PM scores. The first two r 's were not significant but third r was. No sex differences were found on the fluency scores ($t = .467$).

KHATENA, J.A. A Study of Comparative Performance on the Raven's Coloured Progressive Matrices and the Goodenough Draw-a-Man Test in two Singapore primary schools. Unpub. M.Ed. thesis. Uni. of Singapore. 1964.

The relevant content of this thesis may be found in Khatena "Cross cultural measurement of intelligence with the DAM and CPM". Gifted Child Quarterly. 1967.

KHATENA, J. A Study on the Reliability of the Raven's Coloured Progressive Matrices 1947. 1964.

CPM was used with 461 Singapore Primary School children and a year later, a retest was given to 292 of the 461 children. CPM operates most effectively on the 9-10 years of age group. Split half reliability shows values ranging from .82 to .99 and test-retest reliability from .21 to .64, with .71 for the total group.

- A. KHATENA, Joe and GOWAN, J.C. Crosscultural Measurement of Intelligence with the DAM and CPM. Gifted Child Quarterly, 1967. 11 (4) 227-230.

Goodenough Draw-a-Man Test and Raven Coloured Progressive Matrices were administered to students in Singapore schools. Reliability coefficients, raw mean scores and sigmas were represented. Data are compared with those of Indonesian and American samples. It is concluded that at early ages, one culture stimulates different skills from another culture but that schooling tends to smooth out the differences. Intelligence tests, therefore, should be viewed as measures of the efficiency of the environmental background in stimulating the performance of special cognitive skills.

- C.V. KILBURN, K.L. and SANDERSON, R.E. Predicting Success in a Vocational Rehabilitation Program with the Raven Coloured Progressive Matrices. Educ. Psychol. Meas. 1966. 26, 1031-1034.

The paper is concerned with assessing the degree to which the CPM and the Peabody (PPVT) predict patient success in a vocational rehabilitation program (VR) at a hospital for mentally retarded. With 21 patients, a difference was found on CPM between successes and failures, significant beyond the .01 level.

- C. KILBURN, K.L., SANDERSON, R.E. and MELTON, K. Relations of the Raven Coloured Progressive Matrices to Two Measures of Verbal Ability in a Sample of Mildly Retarded Hospital Patients. Psych. Reports. 1966. 19 (3 part I) 731-734.

100 mildly mentally retarded patients were given the CPM, PPVT and the Vocabulary subtest from S-B. There were no significant correlations between the Raven and the other tests. Possible reasons for the lack of the usual correlation of the Matrices with tests of verbal ability for this sample are discussed.

- A. KURODA, Jitsuo. Applications of the Coloured Progressive Matrices Test for the Japanese Kindergarten Children. Psychologia 1959. 2: 173-7.

CPM is a series in order of difficulty of 36 matrices or abstract designs, from each of which a part has been removed. Test data and correlation statistics are given. Test is said to be simple to administer, suitable for cross cultural comparisons and for mental defectives, to be relatively independent of achievement and to motivate subjects. A study with 80 Japanese kindergarten children is reported, using book and board forms of the test. Results correlated with DAM and Zuzuki's Binet.

- A. KURTH, E. Erhöhung der Leistungsnormen bei den Farbigen Progressiven Matrizen. (Increased Performance Norms on Coloured Progressive Matrices). Zeitschrift für Psychologie. 1970. 177 (1-2) 85-90.

454 East German pupils were tested with the non-verbal Coloured Progressive Matrices. Results were compared with those obtained by Raven in England in 1949, by Sperazzo and Wilkins in the United States in 1956 and by Green and Ewert in the United States in 1959. An international score increase was noted and hypotheses for this increase were suggested.

- C. LANGE, Una A. Differential Performances of Minimally Brain-Damaged Boys and of Non-Brain Damaged Boys on Selected Tests. Doctoral thesis. University of Nebraska. 1969.

Results of a battery of tests presented to groups of minimally brain-damaged non-brain-damaged boys showed that the Memory for Designs Test was the most useful single discriminator. The SPM was included in the battery. All combinations which included the MFD were significant at the .05 or .01 levels, with the exception of the complete battery of tests and the combination of Symbol Digit Modalities Test, Benton VRT, CPM, Wide Range Achievement Test and the MFD.

- C. LEVINSON, Boris M. A Comparison of the Coloured Progressive Matrices (CPM) with the Wechsler Adult Intelligence Scale (W.A.I.S.) In a Normal Aged White Male Population. J. Clin. Psych. 1959. 15. 288-291.

The CPM and the WAIS were administered to 89 white men aged 60-84 (average CA 68.71) attending private and public golden age clubs. The means and S.D.'s of the WAIS, Full, Verbal and Performance I.Q.'s were: 100.18, S.D. 15.82; 103.67, S.D. 16.31; 96.76, S.D. 16.20 respectively, and the mean of the CPM was 24.83, S.D. 5.59. The correlations of CPM with age, Full Scale, Verbal scale and the performance scale were: .37, .56, .49 and .55. Percentile norms were set up for the aged population. An analysis of the intercorrelations of the sets as well as of distribution of test scores indicated the feasibility of the administration of an abbreviated scale, consisting of Sets A-B, and of discontinuing the test after five consecutive failures on Set B.

- E. LEVINSON, Boris M. A Comparison of the Performance of Bilingual and Monolingual Native Born Jewish Preschool Children of Traditional Parentage on Four Intelligence Tests. J. Clin. Psychol. 1959. 15: 74-6.

The Revised Stanford-Binet, Form L, the Wechsler Intelligence Scale for Children, Goodenough Draw-a-man Test and the Progressive Coloured Matrices were

administered to 57 native born monolingual and to 60 native born bilingual preschool Jewish children of traditional parentage. Both groups had good command of English and the test results were considered valid by the examiners. There was no correlation between socioeconomic background and intelligence for both groups. The Goodenough Draw-a-Man Test; Information, Comprehension and Similarities of the W.I.S.C. Verbal Scale, Picture Completion Block design, Object Assembly and Coding of the W.I.S.C. Performance Scale were found to give fair estimates of the ability of the native born bilingual Jewish children. On the measures listed, the two groups performed similarly. The socioeconomic level of the fathers was similar in both groups.

LEVINSON, B. A Comparative Study of the Verbal and Performance Ability of Monolingual and Bilingual Native Born Jewish Preschool Children of Traditional Parentage. J. Genetic Psychol. 1960. 97. 93: 112.

Revised Stanford-Binet, WISC, CPM and Goodenough Draw-a-man Test were administered to 58 boys and 59 girls aged 5 to 6 years with traditional Jewish parents. Means and S.D.'s given for all tests for sample as a whole and for categories of monolingual, bilingual, male and female. CPM not used in comparing verbal vs. performance ability as adequate norms not available for this sample.

LEVINSON, Boris M. Positional and Figural Errors made by the Aged on Raven Coloured Progressive Matrices. J. Genet. Psychol. 1962. 100: 183-92.

Study made to determine if there were any significant differences in positional choices and figural errors made on CPM by those aged 60-69 (N=83) compared to those 70-84 years (N=64). There was no significant change in rank order preference. Their positional choice differed from those of children. Medial position was preferred (40.75%) followed by left lateral (32.65%) and right lateral (26.60%). No significant decrease in sensible errors with age although there was a statistically insignificant decrease in "repetitive" errors made by 70-84 group.

C. LEVITA, E. and RIKLAN, M. Cognitive and Perceptual Functions and Lesion Location in Basal Ganglia Surgery. J. Clin. Psychol. 1965. 21 (4) 367-369.

The cognitive and perceptual performance of 22 Parkinsonians was assessed as a function of unilateral cryosurgical lesion placement in relation to the ventrolateral area of the thalamus. Overt verbal and visual/spatial functions are not differentially affected by anteroposterior, medial-lateral and depth aspects of surgical lesion location with one exception (Decrements on the Minnesota Form Board were found between preoperative and follow up scores on twelve items of CPM).

- C. LUER, Gard. Zur Frage objektiver Trennung verschiedener Schwachsinnformen bei Kindern mit psychologischen Tests. (The question of the objective separation of various forms of mental retardation in children with psychological tests). in F. Merz. (Ed) Bericht über den 25 Kongress der deutschen Gesellschaft für Psychologie. Munster 1966 (pp. 469-474).

To ascertain whether distinctions (Classifications) could be made between retardates, 347 retardates were given a battery of 12 psychological tests. Ss were divided into groups on the basis of IQ, age and sex. 3 tests concerned overall intelligence: the Coloured Progressive Matrices, the Columbia Mental Maturity Scale, and the Peabody Picture Vocabulary Test. The other 9 tests included tests of verbal learning, motor development etc. Results, after validity was ascertained, indicate that Ss whose aetiology was exogenous (neurological disturbances) did not perform as well as those Ss having a familial aetiology. It is concluded that psychological tests could be used for classification of retardates.

- A. MAISTRIAUX, R. Les Sous-Evolution des Noirs d'Afrique. Revue de Psychologie des Peuples. 1955. 10, 4. 80-90.

Describes a number of tests developed to assess various aptitudes among Africans. The extent to which each correlates with CPM is reported.

- E. MACARTHUR, R.S. The Coloured Progressive Matrices as a Measure of General Intellectual Ability for Edmonton Grade III Boys. Alberta J. Ed. Res. 1960. 6: 67-75.

For a stratified sample of 300 Edmonton Grade III boys, intercorrelations of 12 ability and achievement measures were factor analysed by centroid method with orthogonal rotation, yielding four factors identified as 'g', schooling verbal and number. Coloured PM had high loading on first factor and had no loadings on the other factors. It was concluded that this test can be employed as an economical indicator of general intellectual ability for boys of this age, for whom group or individual "intelligence" tests may be considered unduly educationally or culturally biased.

- A. MACCOBY, M. and MODIANO, Nancy. A Study of Children's Intelligence in a Mexican Village. Paper presented at Annual Convention of American Psychological Association, St. Louis. 1962.

Coloured Progressive Matrices were administered to a random sample of 51 children, ages 6 to 11, drawn from the census lists of a Mexican village. They scored significantly better on CPM than on either the Stanford-Binet or the Draw-a-Man. It was the one intelligence

test of those administered which correlated with school achievement ($r=.515$, $p=.01$). It can be said that it is the intelligence test which best reflects the village child's ability to perform within his culture, even at tasks which call for verbal and abstract abilities.

- E. McNAMARA, J.R., PORTERFIELD, C.L. and MILLER L.E. The Relationship of the Weschler Preschool and Primary Scale of Intelligence with the Coloured Progressive Matrices (1956) and the Bender-Gestalt Test. J. Clin. Psychol. 1969. 25 (1) 65-68.

The relationships between WPPSI (Weschler Preschool and Primary Scale of Intelligence) full scale, verbal and performance I.Q.'s and eleven WPPSI subtests with Progressive Matrices and Bender-Gestalt Test were explored. 42 culturally disadvantaged, preschool Negro children were administered the tests in counterbalanced order. Pearson product moment correlations were obtained between Matrices scores and WPPSI subtest, scale scores and I.Q. scores. Obtained correlations indicated Bender-Gestalt is highly related to performance areas on WPPSI and may be more appropriately interchanged than P.M. for obtaining estimates of WPPSI full scale I.Q.'s. Full Scale WPPSI I.Q. is not significantly affected by order of administration of WPPSI within the battery.

- C. MALPASS, Leslie F., BROWN, Ronald, HAKE, Donald. The Utility of the Progressive Matrices (1956 edition) with Normal and Retarded Children. J. Clin. Psychol. 1960. 16: 350.

104 retarded children, 56 institutionalised and 48 enrolled in "educable mentally handicapped classes" were given W.I.S.C. and 67 normals enrolled in same schools were given California Test of Mental Maturity. Matrices were administered individually under standard conditions to all subjects. r 's obtained in comparing these I.Q.'s were P.M. & W.I.S.C. for all retarded subjects $r = .506$; for institutional retardates $r = .508$; and for non-institutionalised retardates $r = .511$. For C.T.M.M. and PM, r for all normals was $.541$. These r 's were lower than those reported between 1938 P.M. and C.T.M.M. and considerably lower than those reported by Raven between 1956 P.M. and Stanford-Binet test. Results suggest 1956 revision of P.M. differentiates retarded and normal children quite well and that these matrices demonstrate differences between institutionalised and non-institutionalised retarded children at the same level as I.Q. scores do.

MARTIN, A.W. and WIECHERS, J.E. Raven's Coloured Progressive Matrices and the Wechsler Intelligence Scale for Children. J. Consult. Psychol. 1954. 18, No. 2. 143-144.

Comparing the results of the Matrices, 1947, Sets A, Ab, B with the W.I.S.C. Performances of 100 Indiana Children (aged 9-10) high correlations were obtained between the Matrices and the W.I.S.C. full scale, verbal and performance I.Q.'s.

MEYERS, E., ORPET, R.E., ATTWELL, A.A. and DINGMAN, H.F. Primary Abilities at Mental Age Six. Monographs of the Society for Research in Child Development, Vol. 27, No. 2. Serial No. 82 Lafayette, Ind.: Child Development Publications, 1962.

A battery of 13 tests hypothesizing 4 ability factors (hand-eye psychomotor, perceptual speed, linguistics and spatial reasoning, including PMO was administered to 2 groups, 100 schoolchildren of CA 6 years and 100 institutionalised retarded subjects with average MA of 6. Intercorrelation matrices yielded oblique factors as follows - 6 for school group included the 4 hypothesized factors, a probably immediate memory factor and a tentative diurgent or expressive language factor. 5 factors for retarded group - same as above, but without evidence of a diurgent factor. Intercorrelations of factors given second-order analysis with remitting suggestion of a second order general factor in retarded, but not in school group. In general, school group demonstrated more clearly differentialled mental development. Results suggest at developmental stages in question, differentiation of abilities is already well advanced.

- A. MODIANO, Nancy. Mental Testing Among Tzeltal and Tzotzil Children. Presented at XXXV International Congress of Americanists, Mexico City, 1962.

The Machover's Draw-a-Man Test, Bender-Gestalt, Goodenough's Draw-a-Man and the CPM were given to groups of Tzeltal and Tzotzil children in S. Mexico. Difficulties arose over administration because of cultural expectations. A Board Form was used in some instances. The test may have some value as a gauge of intelligence in cultures other than our own.

- A. MONROE, J.J. Un Test de vocabulaire pour le tri des françois candidats a l'immigration aux etats-unis. (A test of vocabulary for sorting French applicants to the United States). Rev. Psychol. Appl. 1965 15 (4) 239-252.
The results of 508 French candidates for migration chosen at random to explore the possibility of using the Vocabulary Test of Binois and Pichot to exclude cases of mental retardation, as well as those candidates suspected of intellectual deficit on the basis of their results on the Coloured Progressive Matrices (Text in French).
- A. MONROE, J.J. Niveaux d'aptitude mentale de groupes nationaux estimes sur des echantillons au hasard et stratifiés de candidats immigrants. (Mental Capacity Levels of National Origin Groups estimated from random and stratified sampling of Immigration Applicants). Rev. Psych. App. 1965. 15 (4) 219-238.
The levels of intellectual capacity of 1,498 subjects were chosen at random from candidates for migration from three national groups, and scores on the Coloured Progressive Matrices were statistically analysed. Significant effects in the three groups for cultural level, age, sex and married status. The level of achievement for Italians was uniformly less than that for French or Germans (Text in French).
- E. MUELLER, M.W. A Comparison of the Empirical Validity of Six Tests of Ability with Educable Mental Retardates. Doctoral thesis. George Peabody College for Teachers. 1965.
This investigation was designed to evaluate the empirical validity of six general ability tests, designated predictors, against a number of measures of learning. These were the S-B, ITPA, PPVT, PTI, CPM and PMAT. Validity coefficients of the predictor tests against the overall criterion score included CPM .50. Comparison of the coefficients indicated that the PMAT, S-B, PTI and ITPA were significantly more valid than the CPM and PPVT.
- C. MUELLER, M.W. Validity of Six Tests of Ability of Educable Mental Retardates. J. School. Psychol. 1968. 6 (2) 136-146.
Evaluated validity of six tests of ability for prediction of learning ability of primary age educable mental retardates. From a total of 142 subjects, 38 girls and 63 boys, (CA = 9 years) were

studied. Evaluation techniques included correlation of ability tests with achievement and learning task criteria, inter-correlations of ability, tests and multiple regressor. analysis. Results indicate that primary mental abilities test, Stanford-Binet, Pictorial Test of Intelligence (French) and Illinois Test of Psycholinguistic Abilities are equally valid and superior to Coloured Progressive Matrices and PPVT.

NICHOLS, John E. Jnr. Structural Efficiency of the Raven Coloured Matrices. J. Clin. Psychol. 1967. 23 (4) 489.

Study evaluated a short form of Raven Coloured Matrices (CM) as a test of "observation and clear thinking". Brief CM test uses only 12 items. Results were evaluated on 43 child outpatients and compared with WISC results. 20 child outpatients also received a brief WISC, Ammons Full Range Picture Vocabulary, Grace Arthur's Stencil Designs and four tasks in Productive thinking. M.A.'s on full C.M. .79 with M.A.'s on brief CM. Structural efficiency of C.M. test was questioned as Brief C.M. and Full C.M. test produced similar test results. Suggested that brief C.M. could be used with brief WISC to reduce chances of misidentifying children with verbal or language handicaps as being mentally retarded.

C. NICHOLSON, Charles L. Correlations Among C.M.M.S., P.P.V.T. and R.C.P.M. for Cerebral Palsied Children. Percept. Mot. Skills. 1970. 30 (3) 715-718.

Correlations among the PPVT, CMMS and CPM were based on the performance of 38 cerebral palsied children whose mean age was 149.5 months. The coefficients were all positive and significant ($p .05$). Considerable scatter in I.Q.'s was found among all sets of data. The mean I.Q. on the PPVT was approximately 20 points higher than the mean I.Q.'s obtained from the CMMS and CPM, which were approximately equal. Comparison of scores for noncerebral palsied children on these tests showed all three gave similar mean I.Q.'s. However, correlations among tests for noncerebral palsied children differed from those for cerebral palsied children.

- A. NORMAN, Ralph D., and MIDKIFF, Katherine L. Navaho Children on Raven Progressive Matrices and Goodenough Draw-a-Man Tests. Southw, J. Anthropol. 1955. 11:129-36.
The I.Q. level for 96 Indian children with various degrees of white schooling was lower on Progressive Matrices than on Goodenough. Correlation between the tests is low and sex differences on both are negligible. Poor performance on the Raven is consistent with findings on other native populations.
- E. O'BRIEN, K.G. and MACARTHUR, R.S. Reversibility, Intelligence and Creativity in Nine-Year-Old Boys. Child Development, 1969. 40, 1. 33-45.
The relation of Piagetian reversibility to intelligence and to creativity was investigated in 85 nine-year-old Edmonton boys. Data were collected on Piagetian, Torrance, intelligence, age and occupation variables. Factor analyses reduced the Piagetian and Torrance batteries to derived measures of reversibility and creativity, respectively. These were then combined with the other variables for statistical and further factor analysis.
- A. OMBREDANE, A. ET ROBAYE, F. Le Probleme de l'épuration des resultats des tests d'intelligence étudié sur le Matrix-couleur. Comparaison des techniques de reduplication et d'explicitation. Bulletin du Centre d'études et Recherches Psychotechniques. 1953. 4. 3-17.
Discusses the problems experienced by primitive groups in grasping what is required even on apparently culture free test (CPM). Compares the effect of repeat testing with and without explanation for groups of children from the Congo and from Brussels.
- A. OMBREDANE, A., ROBAYE, F. and PLUMAIL, H. Resultats d'une application répétée du matrix-couleur à une population de Noirs Congolais. Bulletin du Centre d'Etudes et Recherches Psychotechniques. 1956. 6. 129-147.
Having described the conditions under which over a period of two years the authors studied a very under-developed black population of Congo, they present a first series of results relating to application of Raven's CPM. Two groups (1) in bush (2) in a mining centre, 1000 examined and 693 results analysed. Found results of CPM considered as a test of the g factor do not only depend on age but also on degree of scholarship. Curve of means a significant degree of differences between these means are given. A provisional standardisation is given for working population at the mining centre.

- C. ORME, J.E. The Coloured Progressive Matrices as a Measure of Intellectual Subnormality. Brit. J. Med. Psychol. 1961. 34:291-2.
Coloured Progressive Matrices scores and W.A.I.S. full scale I.Q.'s were obtained from 203 mentally subnormal subjects, aged 16-65, within 40-80 I.Q. range. Correlation between the two measures indicates the Coloured Matrices is an efficient measure of intellectual subnormality. It has also advantages of being (a) a quickly administered test relatively uninfluenced by attainments or manipulative ability (b) a test of homogenous composition as such, it would appear to have potentialities in work with the mentally subnormal.
- E. RADFORD, J. Verbalisation Effects in a Nonverbal Intelligence Test. Brit. J. Educ. psychol. 1966. 36 (1) 33-38.
Two experiments were carried out with a total of 90 children aged between 9 and 12 to investigate the effects of verbalising on problem solving. The problems were those of the Progressive Matrices intelligence tests. It was found that performance improved when subjects were asked to give reasons for their choices and these reasons were verbally reinforced. Reinforcement is thought to have had the effect of decreasing stereotyped responses.
- A. RATTAN, M.S. and MacARTHUR, R.S. Longitudinal Prediction of School Achievement for Metis and Eskimo Pupils. Alberta J. of Educ. Res. 1968. 14. 1. 37-41.
The current study provides evidence that these three culture reduced tests also have substantial long-term predictive validity for the Metis and Eskimo samples studied. Further, the CPM and SCRIT for the Metis sample, did not differ significantly from the more conventional California Test of Mental Maturity Language and CTTM Total in predicting California Achievement Total Scores over a four year period.
- C. RICH, Charles Clifton. The Validity of an Adaptation of Raven's Progressive Matrices Test for Use with Blind Children. Doctor's thesis, Texas Technological College (Lubbock, Texas). 1963.
Purpose was to determine validity of Coloured P.M. adapted for blind children (Designs perceived by touch), Validity criteria were WISC Verbal Scale I.Q.s, academic grade average, teachers' ratings, grade placement and C.A. P.M. and WISC Verbal Scale given to 115 blind children of both sexes aged 6-15

years. Moderately high correlations between tactual P.M. & C.A. and grade placement were obtained. Correlation of tactual P.M. with WISC Verbal Scale was positive and significant but not as expected if test was highly valid. High relationship found between measures of academic achievement and P.M. scores of children 12 years and older but lower for younger ages. Item analysis showed some items were unsatisfactory.

- C. RICH, Charles C. and ANDERSON, Robert P. A Tactual Form of the Progressive Matrices for use with Blind Children. Personnel and Guidance Journal 1965. 43 (9) 912-919.

CPM were adapted to a tactual format, thus making possible the insightful solution of test items without use of vision. In order to determine the validity of this test as a measure of intelligence in blind children, tactual P.M. scores of 115 blind students were correlated with WISC verbal scale I.Q. scores, academic achievement and chronological age. Subjects ranged from 6-15 years and all had 99% or greater loss of visual efficiency. The tactual test correlated with validity criteria in a positive and significant manner. Kuder Richardson reliability of tactual PM was found to be adequate in children age 9 years and older. It was concluded that this test shows promise as a nonverbal intelligence test for the child 9-15 years of age, but that further development is necessary before it can be considered a useful supplement to the standard tests used with the blind.

- C. RICHARDSON, Elizabeth J. and KOBLER, Frank J. Testing the Cerebral Palsied. Except. Child. 1954 21:101-3, 108-9.

32 cerebral palsied children (22 boys, 10 girls ranging in C.A. from 61 to 138 months) were tested by means of Stanford-Binet, coloured form of Raven Progressive Matrices and two forms of Ammons Full Range Picture Vocabulary test. Product moment correlations between results on Binet and on other three ranged from .74 - .90; between Raven and two forms of Ammons .63 - .64 and between two forms of Ammons .94. Possible merits of using either Raven or Ammons alone or in combination are discussed.

ROBAYE, F., ROBAYE, E. et OMBREDANE, A. Determination de la zone discriminative dans un test a item de difficulte croissante. Bulletin du Centre d'Etudes et Recherches Psychotechniques 1956, 6, 149-159.

The authors studied more than 400 protocols of colour matrix of 3 populations of different level from the point of view of the discriminative age value of the items. The use of the statistics of information R allowed the item test correlation to be established without the necessity of making hypothesis on the normality of the compared variables. The use of a graph facilitates its determination. The examination of the values of R for each item of a test makes possible both a study of the level of a population and also a criticism of the structure of the test to be made. A discriminative zone of the population was established.

A.E. ROHWER, W.D., AMMON, M.S., SUZUKI, N. and LEVIN J.R. Population differences and learning proficiency. J. Educ. Psychology. 1971. 62, 1, 1-14.

The study examined the hypothesis that school-achievement deficiencies of low SES black children are attributable to corresponding deficiencies in learning ability. 288 low-SES black and high SES white children from three Grade levels (Kindergarten, 1st and 3rd) were sampled. The PPVT, CPM and 4 paired-associate measures were administered. Results reveal large population differences on the PPVT and the CPM at all grade levels, the largest difference being between the 3rd grade samples. In contrast the paired associate measures reveal a population difference only at the kindergarten level.

SALVIA, J. and YSSELDYKE, J. An analysis of the reliability and validity of the Ishihara color plates with mentally retarded males. Percept. Mot. Skills, 1971, 33, 243-246.

The reliability and validity of the Ishihara were tested using 69 institutionalised mentally retarded boys. CPM was also administered; no significant correlation was found between the Ishihara and CPM.

C.E. SEIFERT, K.H. Erfahrungen mit dem Progressive Matrices Test bei taubstummten Kindern. Zeitschrift fur Experimentelle und angewandte Psychologie, 1960. 7. 255-290.

Teacher ratings and P.M. of 101 deaf children (aged 8-18) were correlated ($r=.5$). The test differentiated more sharply than the teacher ratings. The results are discussed in terms of differential and development psychology. (Text in German)

- C.E. SEIFERT, K.H. Der Progressive Matrices Test und seine Anwendung bei taubstummen Kindern. Neue Blätter für Taubstummenbildung. 1960. 4. 16-22.

Gives an outline in German of how CPM may be administered to deaf and dumb children, using either the book or a board form. Reports favourably on its use with 150 children aged 8-16, but no data are presented.

- A. SEMLER, Ira J. and ISCOE, Ira. Structure of Intelligence in Negro and White Children. J. Educ Psychol. 1966. 57 (6) 326-336.

Performance levels on the WISC and on CPM and the factorial structures of the WISC were compared for white and negro children. White S's had higher WISC FS I.Q.'s than Negroes at all levels and higher P.M. scores at the 7 year level but not at the 8 and 9 year levels. The P.M. intercorrelation matrices for white and negroes were highly similar.

- C. SILVERSTEIN, A.B. Psychological Testing Practices in State Institutions for the Mentally Retarded. Amer. J. Ment. Def. 1963. 68. 440-445.

Survey of State institutions for the mentally retarded on psychological testing practices. P.M. was one of the tests used and frequency of usage is given.

- A. SPERRAZZO, Gerald and WILKINS, Walter L. Racial Differences on Progressive Matrices. J. Consult. Psychol. 1959. 23: 273-4.

Additional analyses as suggested by Jensen have been carried out, i.e. 3 analyses of variance of socioeconomic status of 480 children. Findings show a significant difference between the races (negro and white) in 2 of the 3 socioeconomic status interactions reported earlier (based on father's occupation in professional, skilled or clerical, unskilled, labour). Surprising that a relatively nonverbal performance test is demonstrably sensitive to differences in socioeconomic levels.

- C. STACEY, Chalmers L. and CARLETON, Frederick O. The Relationship Between Raven's Coloured Progressive Matrices and Two Tests of General Intelligence. J. Clin. Psychol. 1955. 11: 84-5.

Coloured P.M., Revised Stanford Binet (form L) and WISC were administered to 150 children between 7 years 5 months and 15 years 9 months. All were referrals to Syracuse State School for possible mental deficiency but not all were retained in institution. Pearson product moment correlations were obtained between Matrices scores and Stanford Binet M.A.'s and I.Q.'s, WISC I.Q.'s and weighted scores and subtest weighted scores. Correlations

between Matrices scores and Stanford Binet M.A.'s and I.Q.'s were similar but higher than correlations between Matrices scores and WISC I.Q.'s and weighted scores. Highest correlation between Matrices scores and WISC I.Q.'s and weighted scores was for full weighted scores. Correlations between Matrices and WISC weighted subtests ranged from .48 (picture completion) to .28 (coding).

- C. STACEY, Chalmers L. and GILL, Marie R. The Relationship Between Raven's Coloured Progressive Matrices and Two Tests of General Intelligence for 172 Subnormal Adult Subjects. J. Clin. Psychol. 1955. 11: 86-7.

Coloured P.M., Rev. Stanford Binet (form L) and Wechsler Bellevue were administered to 172 subnormal adults between 16 and 57-1/2 years; all under jurisdiction of Syracuse State school. Pearson product moment correlations obtained between Matrices scores and Stanford Binet I.Q.'s, W-B I.Q.'s and weighted scores and subtest weighted scores. Among correlations between Matrices scores and W-B I.Q.'s and weighted scores, highest found was for full scale I.Q.'s. Correlations between Matrices and W-B weighted subtest scores ranged from .60 (Block Design) to .29 (arithmetic).

- N. SPERRAZZO, Gerald and WILKINS, Walter L. Further Normative Data on the Progressive Matrices. J. Consult. Psychol. 1958. 22, 35-37.

The Coloured Progressive Matrices Test was administered to 480 St. Louis school children, ranging in age from 7-11 years. The subjects were selected from 3 St. Louis public schools. One was an all-Negro school, another an all-white school and the third enrolled both white and negro children. Three levels of socioeconomic status, based upon the occupation of the father, were established for purposes of comparison. The first category included professional and semi-professional workers, the 2nd skilled, semi-skilled and clerical workers and the third, labourers, unskilled and service workers. Significant differences were found between age levels, between races and between socioeconomic levels.

- E. TUDDENHAM, Read D., DAVIS, Louis, DAVIDSON, Leslie and SCHINDLER, Richard. An Experimental Group Version for School Children of the Progressive Matrices. Abstract. J. Consult. Psychol. 1958. 22: 30.

Experimental group test version of Raven's P.M. was prepared by "ditto" reproduction process to explore suitability of test for American grade school children. (Test used booklets instead of answer sheets and colour as in 1947 edition was eliminated). Two classrooms representing different socioeconomic

levels were tested at each level from 3rd-6th. Mean scores showed expected progression from grade to grade. Reliability coefficients for separate grade levels range from .87 to .94. Tentative %ile norms for each grade are presented and are close to Raven's norms. Differences between upper middle class and working class schools are substantial and highly significant. Correlations between P.M. and Kuhlman-Anderson, Californian Mental Maturity and Lorge-Thorndike tests are similar - about .40 or .45.

- A. TURNER, G.H. and PENFOLD, D.J. The Scholastic Aptitude of Indian Children of the Caradoc Reserve. Can. J. Psychol. 1952. 6: 31-44.

By total group and by age groups, the Indian children have a significantly lower scholastic aptitude than a comparable group of white children. The abilities of the Indians and Whites cover much the same range and superior Indian children are above the average whites. Importance of environmental differences is pointed to.

- E. TYSZKOWA, Maria. Poziom inteligencji a powodzenie dziecka w pracy szkolnej. (Level of Intelligence and Children's Success in School). Filozofia, Psychologia, Pedagogika. 1963. 6. 39-74.

A series of correlations between select intelligence tests (Binet-Terman, Raven's Progressive Matrices, Kohs Block test) and various indicators of school success ranged from .69 - .96. The tests were useful in differentiating between bright children and those who repeated the initial grades of school.

- E. VAN DER LINDEN, F.J. Intelligentie en School prestaties van jonge Schoolkinderen. (Intelligence and School achievement in Young School Children.) Nederlands Tijdschrift voor de Psychologie. 1970. 25. 5. 278-301.

The scores on three intelligence tests were analysed. (P.M.A. 5-7; Stanford Binet, C.P.M.) Also three reading and three arithmetic tests. After rotation, six factors could be interpreted: school achievement, verbal reasoning, space, number, practical thinking and elementary comprehension. Separate verbal and memory components were not found. More than half the variance could not be declared, supposedly due to low reliability of the test material. (Paper in Dutch.)

VERNON, P.E. Educational and Intellectual Development among Canadian Indians and Eskimos: Part II. Educ. Rev. (Birmingham) 1966. 18, 79-91 and 186-195.

A wide variety of tests was given to indigenous groups of Indians and Eskimos. A variation of scores when compared with English standards was found even on those supposedly 'culture-fair'. It is impossible to infer that these aboriginal groups differ in genetic general intelligence...yet it would be equally unjustifiable to claim that these groups have the same educational and vocational potential as whites...Our second major finding is the rise in scores on most inductive reasoning and perceptuo-spatial tests, associated with a more resourceful and independent mode of existence, and stronger masculine identification in the upbringing of boys.

C. WAMBA, D.E. and MARZOLF, S.S. Use of Eye Movements as a Response Indicator in Testing the Physically Handicapped. J. Clin. Psychol. 1955. 11: 405-7.

Apparatus was devised for administering tests to handicapped people by using eye fixation as means of indicating choice of response. P.M. used to test this 46 children from 6-11 years without physical handicap were randomly assigned to experimental group A or B. Group A given P.M. in booklet form and a week later the adaptation. Order was reversed for Group B. Mean scores of two forms was identical but S.D. for booklet form 3.32 while S.D. for adaptation was 2.62, (difference not significant at 5% level). Correlation between two forms for Group A is .86 and for group B .85. Difference due to order of presentation is significant at 1% level. Most important is lack of difference between two forms of the test.

E. WENKE, W. and MULLER U. Möglichkeiten und Grenzen des Einsatzes diagnostischer Kurzverfahren bei der Schulerauslese. (Possibilities and limitations of several short-cut methods of a diagnostic test in pupil selection.) Zeitschrift für Psychologie, 1966, 172, 82.

Reliability and validity of Raven's Coloured Progressive Matrices as a diagnostic instrument were examined. Groups of 124 normal and 142 under-achievers served as subjects. Number, type and motivational value of the tasks were found adequate for respective age levels. Some of Raven's evaluation procedures were considered misleading and certain corrective

procedures were suggested. The test was found to differentiate well between the various performance levels, and its use as a diagnostic tool is suggested.

WETHERICK, N.E., FITZSIMMONS, E.K. and HILLS D.A.
Inductive thinking in Subnormals. J. Ment. Subnorm. 1969,
15 (2) 79-84.

A test procedure from a previous study, which showed that in normal children inductive reasoning capacity develops in stages between the age of 5 and 10, was used to test inductive reasoning in socially subnormal adults and emotionally subnormal children. In 25 socially subnormal adults covering the same range of scores as normal children on CPM, performance resembled that of children much younger than their CPM scores would have suggested as an appropriate comparison. Only 2 showed any capacity to improve their performance with knowledge of results.

- C. WILLIAMS, J. and WILCOCK J. An Alternative to Binet Mental Age Scores as a Criterion in Discrimination Learning.
J. Ment. Def. Res. 1966. 10. 27-32.

This study arose in the course of discriminative learning experiments with matched normal and severely subnormal subjects. Practice of using CA as a criterion for the former subjects and a Binet Mental age score for the latter was questioned. Coloured PM was considered as an alternative criterion which could be used with both normal and severely subnormal subjects. Results showed that with a severely subnormal population, Progressive Matrices yielded positive and significant correlations with learning ability whereas Binet mental age scored yielded insignificant correlations. Concluded that Coloured Progressive Matrices in a modified form would constitute a useful and more valid alternative to Binet in future experiments on discrimination learning.

- A. WILSON, Lolita. A Comparison of the Raven Progressive Matrices (1947) and the Performance Scale of the Wechsler Intelligence Scale for Children for Assessing the Intelligence of Indian Children. Master's thesis.
University of British Columbia. 1952.

- A. WOBER, Mallory. Notes on Administering Psychological Tests in Africa. Bull. B.P.S. 1967. 20. 68. 25-34.

A brief description is given of the nature and administration of seven tests to a group of industrial employees in Southern Nigeria. Six of the tests (including CPM) used a visual medium of communication, while the last involved proprio-

ceptual information as well. Some difficulties met in doing the visual tests are described, compared to those involved in giving the proprioceptual test. The subjects may not appreciate the rationality of the whole testing situation and it is suggested that it is suggested that it is in this context that attempts to explain bizarre responses might be made.

- A. WOBER, M. The Meaning and Stability of Raven's Matrices Test Among Africans. Intern. J. Psychol. 1969. 4. 229-235.

86 Nigerian adult male subjects took Raven's PM and an adapted Embedded Figures test and six months later took PM again. Retest scores showed a significant rise and a significantly higher correlation with the Embedded Figures Test than appeared at the first testing. Improved scores appeared particularly among lower initial scores. Discussion of related research suggests the importance of the social situation under which testing occurs, the communication method and the possibility that subjects learn to perceive, decode and process information more efficiently in one medium than in another. The complexity of the situation suggests that further research be designed to yield unequivocal results.

4. Advanced Progressive Matrices (APM)
with or without MHV

- C. ADAMS, Anne and FOULDS, G.A. Personality and the Paranoid and Depressive Psychoses. Brit. J. Psychiat. 1963. Vol. 109, 459, 273-278.

A study of two psychotic groups (paranoid and depressive) viewed in terms of personality and symptomatology. MHV and the introductory series of APM were used and correlated with criterion measures but no significant effects were observed.

- A. BIESHEUVEL, S., JACOBS, G.F. and COWLEY, J.J. Maladjustments of Military Personnel. J. National Institute for Personnel Research, 1953. 5. 138-168.

A South African study in which 50 delinquent soldiers sentenced to detention barracks for a variety of offences, 50 soldiers considered maladjusted by their officers on account of their non-conformance to discipline, and a control group of 50 considered in every respect to be well-adjusted were given a variety of diagnostic tests. No relationship was found between intelligence (using APM) and crime or maladjustment to military codes of conduct.

- V. CLARK, D.H., STONE, W.F. and FINNER, S.L. Manpower Utilisation in Maine; A Research Report. Manpower Research Bulletin No. 4, 1969.

A study of the utilisation of the work force in the State of Maine, taking into account age, migrant status and intellectual ability - this last being assessed by APM (Set I).

- E. DAVIES, D.L. A Comparative Study of Some of the Intellectual, Social and Emotional Characteristics of Bilingual and Monoglot Students at a Welsh University College. Master's thesis, University College, Cardiff, 1957.

138 students were given the Welsh Linguistic Background Scale to differentiate those who were monoglot English from those possessing Welsh and English language backgrounds. The 2 groups were then given a battery of psychological tests which included PM, set II, 16 PF, a Cultural Attitude test devised by the author and a comprehensive interest schedule. It was found that bilinguals still obtained lower scores, on the average, than did monoglots in the intelligence test (PM) which was perceptual in character and thus as free as possible from verbal bias.

4.1

FORBES, A.R. An Item Analysis of the Advanced Matrices. Brit. J. Educ. Psychol. 1964. 34, 3, 1-14.

Prior to revising Advanced Matrices (1947) an Item Analysis was carried out on a sample of cases drawn from a parent population of over 2,000. The method of analysis is described and the reasons for the retention and rejection of items given. The findings are discussed in the light of those of Yates (1961). It is concluded that the new edition, P.M. (1962) although shorter will be at least as efficient as the 1947 version.

FOULDS, G.A. and RAVEN, J.C. An Experimental Survey with Progressive Matrices (1947). Brit. J. Ed. Psychol. 1950. 20, 34-10.

From the results of survey, the scale appears to provide a consistent estimate of efficiency with which a person is able to apprehend characters presented for his perception, form comparisons between them and reason by analogy. Low retest reliability before the age of eleven years does not appear to be due to design of test alone, and opens a question of considerable psychological interest. Scale's retest reliability increases rapidly after age of 11 years. Used with adults scale appears to have a high retest reliability, while result obtained on test agree with independent estimates of intellectual ability. Test scores obtained by university students in 40 minutes show no evidence of ceiling effects either at the end of the scale or at any intermediary level.

A.V. GONZALES DEL PINO, ANDRES SANCHEZ nieto, AFRICA DOMINGUEZ DE L. NAVARRO Y CARLOS CASTANO LOPEZ-MESAS. Estudio diferencial de la inteligencia medida con el test de Matrices Progresivas (Raven, Edition 1962) en una Muestra de 7,524 Universitarios Espanoles. (Differential study of intelligence measured with the Progressive Matrices test (1962) on a sample of 7,524 university students.) Revista de Psicologia General y Aplicada. 1969. 24, 711-719.

Spanish university students were tested. The overall group average did not differ from that for English students. There were significant differences among vocational sub-groups of students tested, as well as regional differences. The results in general conformed to previous results of this test. (Text in Spanish.)

- A.V. GONZALEZ DEL PINO, DE LA TORRE, ALEGRE, LOPEZ NAVARO y AFRICA DOMINGUEZ. Estudio diferencial de la Triada Neurotica y Escala Pd del MMPI en Universitarios Espanoles. (A differential study of the MMPI neurotic triad and Pd scales for Spanish university students.) Revista de Psicologia General y Aplicada, 1969, 24, 728-733.

A Spanish language version of the MMPI was given to a university sample of approximately 1200 students. Some significant differences were found between the MMPI scales and the university major chosen, as well as residence district in Spain. A low, negative correlation was found between intelligence as measured by Ravens Progressive Matrices and the MMPI scales. Students with college majors emphasising intelligence (technical and scientific) could be classified as maladjusted in contrast to the less intellectually demanding areas. (Text in Spanish.)

- HUTTON, K. Intelligence Quotients and Differential Fertility. Unpublished Proc. Eugenics Society, 1952.

The author used the Matrices Test (1947) Sets I and II as one of a number in an investigation of 48 boys (aged 15-18) at Winchester College, in investigating the effects on intelligence of differential fertility.

- ISCOE, I. Distributions of Matrices Scores of 71 Freshmen. Unpublished report, University of Texas, 1955.

(a) Distribution of Matrices scores of 71 college freshmen are given and the correlations of Matrices scores with ten other tests. (b) The Mean Matrices score of 54 college students are given and the correlation of the Matrices scores with the four subtests of the WAIS.

- A. KEATS, Daphne M. A Cross-Cultural Study of the Development of Cognitive Structures in University Students with Special Reference to Asian Students in the University of Queensland. Unpub. PhD. thesis. Faculty of Education, University of Queensland, 1970.

The results of this study supported the hypothesis that Asian students could be considered as a unique group differing from Australian students in cultural background and adaptation to the Australian university environment. As part of this study a battery of tests was given, including PM (1947), a reading comprehension test and a vocational interest test. The study covered a three year period and the tests were given at the beginning and end of this period. Progressive Matrices was used as it was a "culture free" test and it was given

4.3

individually. On both the initial and final occasions, the Australian students performed significantly better than the Asians in all performance categories. Difference was significant at 0.01 level. Some practice effect was seen.

The test discriminated between the most successful and the least successful Asian students on the initial occasion but not between the most and least successful Australian students. Performance of other Asian groups was not significantly lower than that of the better Asian students. Further comparisons could not be made because of the smallness of the groups.

McDONALD, R.P. Difficulty Factors and Non-linear factor Analysis. Brit. J. Math. Stat. Psychol. 1965. 18, 11-23.

The performances of a group of children (C) and a group of adults (A) on 12 subtests formed from the Advanced Progressive Matrices have been separately factor analysed. In the Group C results, the second factor can be recognised as a difficulty factor, but the corresponding factor in Group A is not significantly related to the difficulty of the subtests.

- V. PARRY, J.B. Use of Raven's Progressive Matrices Test (1947) in the Royal Air Force. Unpub. Report, 1955.

This version (PM 1947 Set II) is one of the measures used by the R.A.F. for officer and air crew selection, and scored with double timing - for 30 minutes (as a measure of speed), and for 40 minutes (as a measure of power). The 30 and 40 minute scores correlate 0.94. There is a suggested rearrangement of the items on the basis of difficulty. No validation material is yet available, but means, standard deviations and reliabilities are given for a 1950 and a 1955 sample.

SCHEPERS, J.M. A components analysis of a complex psychomotor learning task. Psychologia Africana 1962, 9, 294-329.

Test scores of 150 South African Air Force pupil pilots on Portable Hand-Foot Reaction tests were analysed. Pupils were also given tests of mental ability including APM. Elementary and principal components of the performance and error scores of the RT tests were analysed. A correlation of .45 was found between the factor scores in respect of the first factor and APM. This factor was found to be -

1. Linearly related to the group means of the various speed or quantity scores.
2. Positively associated with induction.

The vector corresponding to this factor has the typical shape of an average learning curve.

TAMHANKAR, V.S. A test report on Advanced Progressive Matrices, 1962. Dept. of Experimental Psychology, Univ. of Poona, 1967.

- V. VENABLES, Ethel C. Placement Problems Among Engineering Apprentices in Part-time Technical College Courses: Part II - Level of Ability Needed for Success in National Certificate Courses. Brit. J. Ed. Psychol. 1961. 31: 56-8.

Generally believed that high failure rates in part time technical college classes are due to lack of ability. Scores on two intelligence tests, including PM and two attainment tests obtained by 678 engineering students in four technical colleges gave a multiple r of 0.31 with success in first year examination or ordinary national certificate. In trade examinations, the figure was 0.61. Curve of least misfits gave "cut off" scores for both groups. Bottom 16% of those taking trade examination courses had failure rate of 72%. For UNC students, failure rate below "cut off" was 68%. Results show by use of two or three standardised tests on entry, colleges could place their students more effectively in three types of course available.

- V. VENABLES, Ethel C. Placement Problems Among Engineering Apprentices in Part-time Technical College Courses: Part I - Range of Ability. Brit. J. Educ. Psychol. 1961, Vol. 31, 237-243.

Engineering students in technical colleges were assessed with verbal (NIIP Group Test 33) and non-verbal (APM) tests. A difference between results on the two types of test was apparent with 77% of the students exceeding the 70th %ile for normals and 87% above the 50th %ile for normals.

- E. VENABLES, Ethel C. Changes in Intelligence Test scores of Engineering Apprentices between the first and third years of Attendance at College. Brit. J. Ed. Psychol. 1961, 31: 257-64.

Groups of part time day release engineering students in three local technical colleges were given verbal and non-verbal intelligence test early in first year and half way through third year. Statistically significance gains were made on verbal test at all levels of initial score. Students who had no failures in the previous two exams showed greater gains than those who failed at least once. Gains also varied according to initial differences in level between verbal and non-verbal scores. Results are compared with those obtained with university students using same verbal test and explanations in terms of intellectual growth, practice effects and "zeal in taking the examination" are discussed.

- E. VOGGENTHALER, Anne Louise. A Comparison of the Progressive Matrices (1947) Set II, With Certain Group Tests Used with High School Students and School Grades. Master's thesis, University of Texas, (Austin, Texas). 1958.
- E. WETHERICK, N.E. Structure and Content in Concept Attainment: A Full Scale Study. Brit. J. Psychol. 1969. 60, (3) 347-50.

Article reported effects of varying problem content on speed & accuracy of concept attainment. A previous finding that undergraduates did, as well or better with unfamiliar content (Hebrew letters) as with familiar content (English letters) was not repeated. Subjects found the English letter form the easiest, followed by the Hebrew and the verbal forms. Intercorrelations between scores on the three forms of task are presented as evidence of the existence of a capacity for inductive reasoning which is closely related to intelligence as measured by Advanced PM.

YATES, Aubrey J. Item Analysis of Progressive Matrices (1947). Brit. J. Ed. Psychol. 1961. 31: 152-7.

Item analyses of Progressive Matrices (1947) were carried out separately for two groups of university students. The results indicated that the test successfully discriminated within relatively homogenous groups of high intelligence. It is suggested that the test could be improved by dropping some of the items and turning it into a power test, rather than one measuring a combination of speed and power.

YATES, A.J. The Relationship between Level and Speed on Two Intelligence Tests. Brit. J. Educ. Psychol. 1966. 36 (2) 166-170.

A group of first year engineering students was given PM (1947) with initial and final time limits: Nufferno Level Test with time limit; and an objective (mathematical) test with initial and final time limits. As in a previous study, Matrices test revealed a slow working group which was handicapped by the time limit. On the Level test, this group completed fewer items within the time limit but obtained as high a level score as the faster working students. The group was shown to be handicapped by the time limit on the objective test. Implications of these results for university selection procedures and relevance of the personality dimension of introversion/extraversion as a possible explanatory factor for the group differences are discussed.

- E. YATES, A.J. Level, Speed and Personality Factors in the Intellectual Performance of Young Children. Brit. J. Educ. Psychol. 1966, 36 (3) 312-316.

Part of PM (1947) and an Arithmetic test were administered with initial and final time limits to a group of 100 nine year old pupils. It was shown that as in previous studies with university students, groups of subjects could be identified who were slow but accurate workers whose intellectual level was severely underestimated by imposed time limits. It was also shown that the same subjects tended to be handicapped by imposed time limits on both tests. No relationship between preferred work method and neuroticism or extraversion scores on the Junior M.P.I. was found.

- YATES, A.J. A Note on Progressive Matrices (1962). Aust. J. Psychol. 1966. 18 (3) 281-283.

A standardisation study on Progressive Matrices (1962) utilising data from 960 new entrants to the University of Western Australia, revealed that the new shorter version of 1947 Advanced Progressive Matrices has not overcome the power/speed contamination problem demonstrated in the earlier version of the test.

- YATES, A.J. Item difficulty level in Advanced Progressive Matrices (1962). To appear, 1972.

Advanced Progressive Matrices (1962) was administered to 554 university students as part of a laboratory class. Mean scores and percentage of Ss passing, failing and not attempting each item were calculated at 40- and 60-minute time limits, and in relatively "unlimited" time. The provision of "unlimited" time practically eliminates the "not attempted" category and enabled a determination to be made of the true difficulty of each item, unconfounded by differences in speed of working. It is suggested that the test should be reduced to 20 items and reconstructed in cyclic form.

5. Mill Hill Vocabulary (MHV) only

- N. A.C.E.R. Australian Supplement to the Guide to using the Mill Hill Vocabulary Scale. Mimeographed, ACER, Victoria, 1965.
- C. CHAPMAN, James and McGHIE, Andrew. A Comparative Study of Disordered Attention in Schizophrenia. J. Ment. Sci. 1962, 108, 455, 487-500.

A previous clinical study suggested that a breakdown in the normal selective and inhibitory functions of attention is a primary disorder in schizophrenia. The present investigation attempts to examine experimentally the validity of this general proposition and of other specific hypotheses derived from it. A battery of tests designed to assess the effect of distracting stimuli upon attentive behaviour was applied to matched groups of 20 schizophrenic patients, 20 non-schizophrenic and 20 normal subjects. It proved possible to differentiate the schizophrenic group from the normal and patient control groups by their poor performance on a number of these tests, (Figure-Matching, Spot Tracer, Auditory-Visual Distraction, Auditory-Visual Integration, Auditory-Rotor). Although the scores produced on these tests significantly differentiate the schizophrenic group as a whole, there was a wider scatter in the individual performance of the schizophrenic patients. Some of the schizophrenic patients returned scores on the tests which were at least as high as that of the lowest scoring subjects in the non-schizophrenic patient group. Further analysis revealed that this overlapping of individual test scores was mainly due to the marked deficiency of the hebephrenic patients, all of whom performed at a significantly low level. The implications of these findings are discussed and future lines of investigation are considered.

CRAIK, F.I.M. and MASANI, P.A. Age Differences in the Temporal Integration of Language. Brit. J. Psychol. 1967. 58. 291-299.

Two short experiments were carried out to examine age differences in short term memory for various types of material. Subgroups were divided on the basis of scores on MHV. Results confirmed that old subjects are at a greater disadvantage when dealing with highly meaningful material and also showed old subjects to be vulnerable to the effects of supra span interference.

5.1

CRAIK, F.I. and MASANI, P.A. Age and Intelligence Differences in Coding and Retrieval of Word Lists. Brit. J. Psychol. 1969. 60 (3) 315-319.

Word lists of several orders of approximation to English were presented for immediate free recall to young and old adult subjects. Total recall scores were broken down into "number of chunks recalled" and "number of words per chunk". "Chunks recalled" measure is taken here to reflect retrieval efficiency; scores were lower in older subjects but were unaffected by Mill Hill Vocabulary level. "Words per chunk" score is interpreted as measure of coding efficiency; age had no effect on this measure, but scores were poorer for subjects of lower vocabulary level. Conclusion drawn from a previous study that there is an age decrement in coding efficiency, was thus not supported by the analysis. It was concluded rather that main effect of age is on retrieval, while coding is affected by verbal intelligence.

- C. DAVIDSON, P.O., PAYNE, R.W. and SLOANE, R.B. Introversion, Neuroticism and Conditioning. J. Abnorm. & Social Psychol. 1964, 68, 2. 136-143.

A study with students from whom were obtained measures of introversion, neuroticism and conditioning. Mean MHV scores were also obtained. None of the conditioning indices were significantly correlated with introversion, neuroticism or manifest anxiety as assessed by various questionnaires or with an independent psychiatric rating of anxiety based on an interview.

DUNSDON, M.I. and FRASER-ROBERTS, J.A. The Relation of the Terman-Merrill Vocabulary Test to Mental Age in a Sample of English Children. Brit. J. Stat. Psychol. 1953. 6, (2), 61-70.

Intelligence tests intended to cover the whole range of school age must be applied individually. For the comparison of large groups, vocabulary tests have manifest advantages in respect of reliability, validity, relative absence of practice effect, and, above all, in the amount of information obtained per unit of testing time. Accordingly, four vocabularies are being given to school children at Bristol, selected by a method which, it is hoped, will give a good random sample. The present paper presents data from a sample of English children showing the relation of the Terman Merrill Vocabulary Test to the scale as a whole. The sample consists of results obtained by applying Form L to 450 children ranging in age from 7.0 to 14.11 years. These were selected from the results available so as to yield a

5.2

sample which a mean I.Q. of 103 and a standard deviation of 17. To them were added data for 52 children aged 5.0 - 6.11 years, who were slightly lower in I.Q. and slightly less variable. The overall partial correlation between number of words and M.A. at fixed C.A. is .842, which is in close agreement with the results of other workers. Thus 70% of the information is obtained in 10% of the testing time. The regressions of words on M.A. and of M.A. on words are non-linear. The form of the curves is reflected in lower correlations between number of words and M.A. in the 7th, 8th and 9th years of life, these being respectively .71, .60 and .72. The other age group correlations range from .82 - .90.

DUNSDON, M.I. and FRASER-ROBERTS, J.A. A Study of the Performance of 2,000 children on Four Vocabulary Tests: I Growth Curves and Sex Differences. Brit. J. Stat. Psychol. 1955. 8, (1) 3-15.

(1) A 3% sample of the school children of the City and County of Bristol was selected by visiting all schools (including a number outside the city) and choosing those children, between the ages of 5.0 to 14.11 years, whose homes were within the city and whose birthdays fell on the first day of any calendar month. Four vocabulary scales were used: that from the Terman Merrill scale, Form L; Mill Hill Vocabularies A & B; and that from the Wechsler Intelligence Scale for Children. (2) The present paper gives the first results. The establishment of norms will be dealt with later. (3) All four vocabularies proved to be sex-biased in favour of boys, who on the average defined more words at every age studied. The differences were fairly substantial, and all were highly significant. (4) In 5 out of 8 comparisons given by 2 sexes and 4 vocabularies, the increment of score with C.A. showed no significant departure from linearity. Three showed some divergence. There was no significant departure from linearity in the combined score for all vocabularies. (5) The intercorrelations of the four scores, reduced to fixed age, were of the order of rather more than .8, they showed little variation in magnitude. (6) It is shown that omission of children attending private and independent schools would have distorted the results very seriously: on the other hand, absentees on the dates of the original visits to the school were not greatly lower in performance than the remainder, and their omission, in this particular sample, would not have altered the results very appreciably. It is not suggested, however, that this would be in general a safe procedure.

DUNSDON, M.I. and FRASER-ROBERTS, J.A. A Study of the Performance of 2,000 Children on Four Vocabulary Tests: II Norms, with Some Observations on the Relative Variability of Boys and Girls. Brit. J. Stat. Psychol. 1957. 10 (1), 1-16.

This paper gives norms for the vocabularies from the Terman Merrill and Wechsler Intelligence Scales, the oral definitions form of Mill Hill Vocabulary Scales A and B, and for all four vocabularies combined. In view of the sex difference, norms are given separately for boys and girls. Curves have been fitted for the increment of score with advancing age; and tables are given from which deviations from expectation can be read off. Further curves have been fitted for the increment of variance with advancing age. Deviations from expectation can be made comparable for children of different ages by multiplying by the ratio of the standard deviation, at observed age to a fixed standard deviation. Tables of multipliers are given for making this further adjustment, which also makes scores comparable for children of opposite sex. It is shown that for this sample the adjustment scores are, with small exceptions, independent of age at test, and that they equalise for children of opposite sex. The frequency distribution is substantially normal. In terms of the coefficient of variation, girls were more variable than boys in the younger age groups. At about 8 or 9 years equality is reached, and thereafter boys become progressively more variable than girls up to the age of 11 or 12. Beyond this age, the difference between the sexes is progressively reduced.

- C. FOULDS, G.A. and OWEN, A. Speed and Accuracy on Mazes in Relation to Diagnosis and Personality. Brit. J. Soc. Clin. Psych. 1963, 3. 34-35.

Hypothesis was that schizophrenics should have a higher Wrong Direction score on the Porteus Mazes, regardless of personality, than should neurotics. Subjects were 24 neurotics and 20 schizophrenics matched for Vocabulary level on MHV. 2 other tests were also given and correlations between the tests are presented. Results showed a significant tendency for those who score towards the schizophrenic end of the Non-Integrated Psychotic Scale to have more Wrong Directions on the Mazes, regardless of personality type.

GIBSON, H.B. A Slang Vocabulary Test as an Indicator of Delinquent Association. Brit. J. Soc. Clin. Psycho. 1963. 2, 50-55.

The rationale of the Slater Selective Vocabulary test was followed in devising a test which would indicate habitual delinquent association. Pilot work gave a list of slang words likely to be familiar to delinquent boys and a test instrument was composed of these words buffered with items from the Mill Hill Vocabulary Scale. This instrument gives separate measures of knowledge of delinquent slang and of general vocabulary level. The test was administered to groups of normal and delinquent boys and factor analysis of the results indicated that slang knowledge exists somewhat independently of general vocabulary knowledge. The delinquent group had a significantly greater slang knowledge relative to their vocabulary level than the normal boys. Proposals for further use of the technique are discussed.

- C. HAWKS, D.V. and PAYNE, R.W. Overinclusive thought disorder and symptomatology. British Journal of Psychiatry. 1971, 118, 547, 663-670.

Groups of male schizophrenics were compared with normals on tests of thought disorder. One criterion of selection was that all were assessed for a minimum performance on the MHV.

- C. KENDRICK, D.C. Assessment of Premorbid Intelligence of Elderly Patients with Diffuse Brain Pathology. Psych. Reports. 1964. 15 (1) 188.

60 elderly subjects, matched for age, education and SES were divided into 'organic' and depressed categories. All Ss were given the verbal WAIS and MHV 'Synonyms'. Scores obtained on the Mill Hill with 'organic' patients are significantly higher than for their respective WAIS verbal I.Q.'s but that there is no difference for the depressed groups.

- C. PAYNE, R.W. The Long Term Prognostic Implications of Overinclusive Thinking in Mental Patients: A follow up Study using Objective Tests. Proceedings of the IV World Congress of Psychiatry, Madrid. 1966. 2657-2660.

114 admissions to a mental hospital were given a battery of tests of thought disorder immediately upon admission before any treatment had commenced. The MHV was also given.

5.5.

- C. PAYNE, R.W. Cognitive Defects in Schizophrenia: overinclusive thinking. In J. Hellmuth (Ed) Cognitive Studies, Vol. 2. Brunner/Mazel, New York, 1971.

A survey of tests of thought-disorder, including the extent to which reports show any association with measures of intelligence: No significant correlation was found between MHV and tests of thought disorder in any of the studies reported.

- C. PAYNE, R.W. and FRIEDLANDER, D. A Short Battery of Simple Tests for Measuring Overinclusive Thinking. J. Ment. Sci. 1962. 108, 454, 362-367.

The three best measures of overinclusion thinking in Payne and Hewlett's battery, those which had the highest saturations on the factor of over-inclusion, were the non-A score from the Object Classification Test, the average number of words used in explaining the Benjamin proverbs, and the average number of objects per group selected during the 'handing over' experiment in the Goldstein Object Sorting Test.

- C. PAYNE, R.W., EVESON, M.B. and SLOANE, R.B. The Relationship between Blood Cholesterol Level and Objective Measures of Personality. J. Psychosom. Res. 1963, 7. 23-34.

A group of 48 male university student volunteers, whose fasting blood cholesterol levels were known, was investigated intensively.

- PAYNE, R.W., NETLEY, C.T. and SLOANE, R.B. Rigidity, Drive and Conditioning in Neurotics. Brit. J. Psychol. 1967. 58 (1-2) 111-126.

Four of Brengelmann's questionnaire measures of rigidity, drive scale, the M.A. scale, the MPI and the Mill Hill Vocabulary Scale were given to 30 neurotic and 30 normal female subjects. In Experiment 1, the eye blink response was conditioned to a tone, an air puff being the UCS. In Experiment 2, the finger flexion reaction to an unavoidable electric shock was conditioned to a tone. G.S.R. heart rate responses were measured simultaneously. J.C. Brengelmann's finding that the rigidity questionnaire scores were significantly correlated with drive, anxiety, and neuroticism questionnaire method were confirmed. Data suggested that with the G.S.R. and heart rate responses only pseudoconditioning was obtained. Implications of this are discussed.

5.6

- C. PAYNE, R.W. Overinclusive Thinking in a Depressive and a Control Group. J. Consult. Psychol. 1957. 21, 2, 186-188.

The present results suggest that depressives "overinclude" significantly more than normals on Epstein's test. In fact, depressives are probably more abnormal with respect to 'overinclusion' of thinking than are schizophrenics. MHV was included in the test battery.

- RAVEN, J.C. and WALSHAW, J.B. Vocabulary Tests. Brit. J. Med. Psychol. 1944. 20: 185-94.

As vocabulary tests have repeatedly proved to be the most satisfactory means of assessing a person's verbal ability acquired as the result of intellectual activity in the past, we have constructed a scale (the Mill Hill Vocabulary Scale) which as far as we are able to judge, meets the need for a test of this kind as a complement to Progressive Matrices (1938), intentionally designed to record a person's intellectual activity at the time of testing regardless of all previously acquired knowledge.

- SHIELDS, J. Monozygotic Twins. London O.U.P. 1962.

This book reports extensive data on twins reared together and apart. Chapter 8 deals with intelligence. The Dominoes Test and MHV were used as nonverbal and verbal measures respectively. The two tests correlated about +.48 over the whole group, being higher in females and Controls, than in males and separated twins. The results suggest that the differences in early environment found in this sample might have had an effect on intelligence but this effect cannot be conclusively demonstrated. The importance for intelligence of heredity is confirmed.

- C. VINODA, K.S. Personality Characteristics of Attempted Suicides. Brit. J. Psychiat. 1966. 112. (492) 1143-1150.

A battery of five tests consisting of Mill Hill Vocabulary, Hysteroid-Obsessoid Questionnaire, the Hostility Scales, a level of aspiration-tapping test and Symptom Sign Inventory was administered to a group of 50 female attempted suicides, 50 psychiatric controls and 50 normal controls coming from a general hospital, matched individually on variables such as age, education, occupation and marital status in order to study the personality characteristics of attempted suicides that differentiated them from other psychiatric patients and normals who have not made any such attempts at suicide. Results indicated that attempted suicides had more general

hostility and were more rigid than the psychiatric controls. These differences apart, they were much more like the psychiatric than the normal controls.

WARREN, Neil. Social Class and Construct Systems. An Examination of the Cognitive Structure of Two Social Class Groups. Brit. J. Soc. Clin. Psychol. 1966. 5 (4) 254-263.

Bernstein contends that differences in linguistic coding are associated with social class groupings and primary among consequences claimed for differential linguistic coding are differences in the organisation of cognitive processes. This study attempted to examine the cognitive aspects of Bernstein's theory. A modification of Kelly's repertory grid technique and Mill Hill Vocabulary Scale were administered to groups of middle and working class subjects, very similar in composition to those employed by Bernstein in his own empirical work. Three structural measures of cognitive processes were extracted from the repertory grid data and an interesting incidental finding of class differences in the use of the construct "unusual" is also reported. Results are discussed and various conclusions drawn. It was considered that a measure of support had been provided for certain aspects of Bernstein's theory, with a possibility of further support awaiting clarification of one of the cognitive measures.

6. Other Combinations of R:M and MHV

- C. ALLEN, Robert M., and COLLINS, Marjorie G. Suggestions for the Adaptive Administration of Intelligence Tests for those with Cerebral Palsy: Pt. 1. "Administration of the Ammons Full Range Picture Test, Columbia Mental Maturity Test, Raven's Progressive Matrices and Leiter International Performance Scale." Cerebral Palsy Rev. 1955 16: 11-14+25.

Specific suggestions are given for adapting the Ammons Full Range Picture Vocabulary Test, the Columbia Mental Maturity Test, Raven's Progressive Matrices and the Leiter International Performance Scale for use with persons who are cerebral palsied.

ANASTASI, Anne. Psychological Testing. MacMillan, New York. 1961 2nd Ed.

A student's introduction to the CPM, SPM and APM (Ch. 10).

- C. ARELASTER, P.G. and JESSOP, M. Intelligence as a Factor Affecting the Diagnosis of Pulmonary Tuberculosis. Brit. J. of Tuberc. & Diseases of the Chest. 1957, 51, 358-366.

Early diagnosis is especially important in middle aged and elderly males who form the majority of the tuberculosis infector pool. Early doctor consultation probably depends upon certain mental faculties. There is a wide intelligence difference as measured by the Matrices test, between patients with minimal and with extensive pulmonary tuberculosis. This may have a bearing upon early diagnosis and be relevant to case finding methods.

- A. BIESHEUVEL, S. (Ed.) Methods for the Measurement of Psychological Performance. International Biological Programme Handbook No. 10. Oxford, Blackwell, 1969.

The handbook is the product of a conference on psychological performance testing held in London in September, 1967. A reviewer states "The final chapter on higher mental processes lists only a few of the tests available. The development of all the tests mentioned, with the exception of the Porteus Maze and the Progressive Matrices, have been done by the contributors in the conference. No special position is taken on higher mental processes.

6.1

BURKE, Henry R. Raven's Progressive Matrices: A Review and Critical Evaluation. J. Genet. Psychol. 1958. 93, 199-228.

The evidence indicates that at least Progressive Matrices (1938) has been very widely used, especially in England, clinically and in the British services, but that it could and should be improved, with respect to both reliability and validity, especially for use in important diagnostic decisions about an individual. It is not a substitute in any sense for the Binet or Wechsler tests, nor for any verbal or nonverbal group test of mental ability, but is perhaps an almost equally useful supplement, and shows intercorrelations with such tests as high as they show with one another. The evidence is not unequivocal that it is largely a pure test of Spearman's construct g , even if such a device were possible. It has nevertheless been a useful research tool, especially in the study of the growth and deterioration of mental efficiency. It has special value for use with special groups such as the deaf and spastics. Its value for cross-cultural studies needs to be explored further. The revisions of P.M. (1938), P.M. (1947), Sets A, Ab, B, and P.M. (1947) Sets I and II are still in need of cross-validation research.

BUROS, O.K. (Ed.) The Fourth Mental Measurements Yearbook. Gryphon Press. New Jersey, 1953.

Reviews of CPM, SPM and APM by Charlotte Banks, W.D. Wall and George Westby.

BUROS, O.K. (Ed.) The Fifth Mental Measurements Yearbook. Gryphon Press. New Jersey, 1959.

Literature Summary.

BUROS, O.K. (Ed.) The Sixth Mental Measurements Yearbook. Gryphon Press. New Jersey, 1965.

Review of CPM, SPM and APM by Morton Bortner.

T. BUTCHER, H.J. Human Intelligence: Its Nature and Assessment. London. Methuen, 1968.

An evaluative discussion of Matrices tests in the context of a survey of intelligence tests (Chapter 9).

- C. CASHMAN, M.D. and LAWES, T.G.G. A Controlled Trial of 'Gerioptil'. Brit. Med. J. 1961. 1, 554-556.

A small controlled trial has been carried out with six subjects and six controls of the effect of 'Gerioptil H3' on the mental ability, as measured by a number of psychological tests, of patients with senile or arteriosclerotic dementia. The trial has failed to prove that Gerioptil is of any value in this respect.

- C. CLAUSEN, Johs. Ability Structure and Subgroups in Mental Retardation. MacMillan & Co., London, 1966.

An extensive battery of psychological tests (including perceptual, psychomotor and cognitive measures) was administered to three groups of mental retardates (C.A. 8-10, 12-15, 20-24) as well as a normal sample (C.A. 8-10). In addition information was gained regarding etiology, E.E.G. abnormalities and neurological signs. Combined CPM and SPM were included in the factor analysed treatment of data and raw scores compared specifically with Porteus' Mazes. Thurstone's PMA was also given. Reported data are composite scores of CPM and SPM so one cannot readily compare with other published values.

- T. CRONBACH, Lee J. Essentials of Psychological Testing. Harper and Row. 3rd Ed. 1970.

Description of Matrices tests with discussion of relevant applications. (Ch.8).

- DENMARK, F.G.W. An investigation of some problems in the education of partially deaf children. M.A. Thesis University of Liverpool,

The grading of children with defective hearing, the development of electronic hearing aids and methods of determining the hearing capacity of children suffering from partial deafness are discussed. The results of audiometric, mental and attainment surveys of ninety-nine children in a school for the partially deaf are reported. Finally, recommendations are made for the education of partially deaf pupils.

Ninety-nine partially deaf pupils aged 7 to 15 were tested with the Raven's Matrices Test and the Mill Hill/Crichton Vocabulary scales. Of these one child was found to fall into Grade I, eight children into Grade II, twenty-seven into Grade III, forty into Grade IV, and twenty-three into Grade V on the Raven's Matrices. The mean verbal retardation was approximately five years. The children were also tested on the Schonell Mechanical Arithmetic Test and the Schonell Prose Reading Test (R2). Mean retardations of 2.8 years and 4.0 years respectively were observed on these tests.

6.3

Editor: Raven's Intelligence Test. Reply to query.
Brit. Med. J. 1947 4506:776. Reply by John C. Raven.
Brit. Med. J. 1947 4510:872.

EDITORIAL REPLY:

P.M. is an almost pure 'g' test, but a visuo-spatial or 'k' factor is involved to some extent. Test rather disappointing in practice - reliability, low, susceptible to nonintellectual influences, e.g. age, temporary emotional stress and functions unequally at different ranges of intelligence.

RAVEN'S REPLY:

P.M. not intended to be test of "general intelligence". Designed to assess a person's output of intellectual activity at time of testing. Only under certain circumstances does 'k' factor affect results. Test varies in health and illness but not necessarily unreliable as output of intellectual activity not always same. Test does not depend on acquired knowledge and so able to distinguish backwardness due to loss of schooling from genuine mental deficiency. Adult scores decline with age. Tests which don't show this, not necessarily better tests.

- C. EISENTHAL, S. and HARFORD, T. Variation in the Form and Administration of Raven's Progressive Matrices Scale in a Neuropsychiatric Population. Psych. Rep. 1969. 24 (1) 262.

Examined two forms of Raven's Progressive Matrices, a five set achromatic form for adults and a three set chromatic form for children. 100 subjects were randomly assigned to one of four conditions. There were 25 subjects per cell in a 2 x 2 design; achromatic vs. chromatic form and individual vs. group administration. Two scores were devised as (1) total number of correct responses to all five sets of matrices and (2) number of correct responses to subtests A & B. Analyses of variance yielded no significant results. Group and individual administration yielded comparable data for Progressive Matrices. Enhancement of performance with chromatic sets of matrices was not demonstrated.

ESTES, B.W., CURTIN, M.E., DeBURGER, R.A. and DENNY, C. Relationships between 1960 Stanford-Binet, 1937 Stanford Binet, W.I.S.C., Raven and Draw-a-Man. J. Consult. Psychol. 1961, 25, 388-391.

The comparability of I.Q.'s from five different intelligence tests was investigated for an above average group of white American children.

- C. FEINBERG, I., KORESKE, R.L. and SCHAFFNER, I.R. Sleep Electroencephalographic and Eye Movement Patterns in Patients with Chronic Brain Syndrome. J. Psychiat. Res. 1965. 3. 11-26.

Each chronic brain syndrome (CBS) patient was tested with W.A.I.S., Wechsler Memory Scale and PM (child and adults forms) as well as EEG and eye movement Rank order correlation coefficients were computed between scores on the psychometric measures available for the seven testable CBS patients and several sleep variables. The WAIS verbal, Performance and Full Scale scores and I.Q.'s and the Wechsler Memory Scale and PM scores were not significantly correlated (0.05 level) correlated with total sleep, dream time, % dream time, REM, % REM or with eye movement density values. These negative results cannot be considered conclusive with so small a sample.

- FISHER, D. The social and emotional adjustment of children with impaired hearing attending ordinary classes. M.Ed. Dissertation, University of Manchester, 1965.

The adjustment, ability and attainments of 83 children with impaired hearing attending ordinary classes were studied. The children were aged 5.4 to 16.0 years with a mean of 10.1 years. There were 41 boys and 42 girls. A control group of 82 pupils with normal hearing was also tested. Social-emotional adjustment was assessed by means of the Bristol Social Adjustment Guides and the Cattell Personality Questionnaire. The mean Bristol Guide score of the experimental subjects was 11.9, only 47 per cent of the subjects scoring less than 9. No association was found between adjustment score and hearing loss. Mean sten scores of 5.5 and of 4.9 were found on the anxiety and extroversion factors respectively of the Cattell Questionnaire. Non-verbal and verbal abilities were assessed by means of the Raven's Progressive Matrices (Standard or coloured as appropriate to the child) and the Crichton/Mill Hill Vocabulary scales. A normal distribution of scores was found on the Matrices, but on the Crichton/Mill Hill scales both the mean and the median fell between Grades III and IV.

- T. FREEMAN, Frank S. Theory and Practice of Psychological Testing. Holt, Rinehart and Winston. 3rd Ed. 1962.

Summarises research on reliability and validity coefficients. (Ch.15).

- C.E. GASKILL, P. Tests of Abilities and Attainments. Chapter 9 in EWING, A.W.G. Educational Guidance and the Deaf Child. Manchester University Press, 1957.

Reports the testing of 350 deaf children aged 11-15. 50% were in Grades IV and V, using SPM. A study by Stanton using SPM also found a positively skewed distribution with deaf children. A study by Gaskill using CPM with 289 children aged 5-11 showed a normal distribution.

- C.V. HAMILTON, V. and SALMON, P. Psychological Changes in Chronic Schizophrenics Following Differential Activity Programs. J. Ment. Sci. 1962, 108, 455, 505-520.

The investigation reported here attempted to carry out an objective comparison of certain psychological, clinical and social effects following upon Workshop therapy, Occupational therapy and the absence of any specific activity for male chronic schizophrenics. The data obtained showed that while all three conditions led to improvements on the measures employed, the group receiving Workshop therapy improved to the greatest extent.

- C. HARFORD, Thomas. An Item Analysis of the Progressive Matrices Test for Samples of Male Schizophrenic Patients. J. Clin. Psychol. 1967, 23 (?) 377-380.

The major conclusion from the study is that the PM cannot be applied indiscriminately to schizophrenic patients since it appears to be of less value for higher socioeconomic groups. The status of the CPM for the State hospital sample is less certain since form Ab was omitted from the testing situation. Further studies are needed to determine the significance of the CPM for this group.

- C. HIGASHIMACHI, Wilfred H. The Construct Validity of the Progressive Matrices as a Measure of Super Ego Strength in Juvenile Delinquents. J. Consult. Psychol. 1963. 27: 413-9.

Raven's P.M. (1938 and 1947) were used to determine their sensitivity in reflecting differences in super-ego strength and functioning. Postulated that high score on Matrices is associated with measure of strong super-ego on Picture Arrangement Test (PAT) and low score on Matrices with measure of weak super-ego on PAT when general ability was kept constant. Twelve delinquent boys composed strong super-ego group and 12 the weaker super-ego group. Combined Matrices scores showed strong super-ego group had a significantly higher score beyond .01 level of confidence than weak super-ego group. Results supported fact that Matrices are sensitive in reflecting differences in super-ego strength and functioning in population of delinquent boys.

- C. IRVING, G., ROBINSON, R.A. and MACADAM, W. The Validity of Some Cognitive Tests in the Diagnosis of Dementia. Brit. J. Psychiat. 1970. 117. 537. 149-156.

The validity of a number of cognitive tests (including PM and Mill Hill Vocab.) in discriminating between brain-damaged and non-brain-damaged elderly patients has been assessed against the criteria of psychiatric diagnoses and EEG classification. The association between these criteria and test classification is shown for two separate samples of approximately consecutive admissions. Several of the measures would appear to affect this differentiation at levels high enough to warrant their clinical application. Although the organic group was older than the functional this does not appear to have had any significant effect on the validity of the test measures in discriminating between the diagnostic groups.

- A.E. JENSEN, A.R. and ROWHER, W.D. An Experimental Analysis of Learned Abilities in Culturally Disadvantaged Children. Report, Office of Economic Opportunity. 1970.

This report includes several studies involving CPM and SPM which are taken to epitomise the author's concept of "Level II intelligence" which "is characterised by the transformation and manipulation of the stimulus prior to making the response. It is the set of mechanisms which make generalisation possible". Comparisons among different groups using a variety of intelligence and memory tests point to socioeconomic status as a major variable in PM performance. Racial differences between Negro and white children were also clear in the subjects studied. "The hypothesis that the white-Negro differences is mainly attributable to culture bias, in the sense in which it is defined here ... is not supported by these data".

- C. KENDRICK, D.C., PARBOOSINGH, R.C. and POST, F. A Synonym Learning Test for Use with Elderly Psychiatric Subjects: A Validation Study. Brit. J. Soc. Clin. Psychol. 1965. 4. 63-71.

In the course of the development of the Synonym Learning Test (SLT) groups of elderly patients were given a battery of tests. This included MHV and CPM and it was noted that "the brain damaged group is clearly differentiated from the depressed groups of CPM. MHV (Synonyms) gave a better estimate of premorbid level of intelligence in brain damaged subjects than of the other intelligence tests.

- C. KIDD, Cecil B. Criteria for Admission of the Elderly to Geriatric and Psychiatric Units. J. Ment. Sci. 1962. 108, 452, 68-74.

A method of assessing physical and psychological disturbances in old people admitted to geriatric or mental hospitals is described. A sample of admissions aged 60 years and over to Wakehurst House (geriatric) and Purdysburn Hospital (mental) were so assessed.

- A.N. MACARTHUR, R.S. Mackenzie District Norming Project. Dept. of Northern Affairs and National Resources. Ottawa, 1965.

Report gives 4 sets of stanine norms for pupils of the Mackenzie District of the Canadian Northwest Territories for a group of tests, including CPM and SPM. Pupils were Eskimo Indian-Metis and White and norms are given for each group, as well as for the total.

- A.E. MACARTHUR, R.S. Assessing Intellectual Potential of Native Canadian Pupils: A Summary. Alberta J. Educ. Res. 1968. 14, 2, 115-122.

This article summarizes evidence of the construct validity of several "culture-reduced" measures of intelligence, including PM. Evidence suggests that, until research can improve on these tests, such culture-reduced measures of general intellectual ability as PM, SCRIT, IPAT Cattell, and Lorge-Thorndike Non-verbal should be included in testing programmes for individual native Canadian pupils.

Reasons:

1. Items form something of an age scale, sampling stages in the development of human cognition.
2. The tests use as stimuli symbols which, though dependent on learning are likely to be learned in a variety of cultures.
3. Arrangement of items in the test itself forms a crudely-programmed sample of learning-on-the-spot. These 3 characteristics suggest directions for further research. An additional conclusion is that large proportions of Canadian native pupils of early school

age than the general intellectual ability necessary for participating fully in the larger Canadian community.

- A.E. MACARTHUR, R.S. and ELLEY, W.B. The Reduction of Socio-Economic Bias in Intelligence Testing. Brit. J. Ed. Psychol. 1963, 33, 107-19.

Study was designed to investigate extent of socio-economic bias in selected intelligence tests (to better estimate intellectual potential of students from deprived cultural and education backgrounds). Nine culture-reduced tests and subtests were administered to a representative Edmonton sample of 271 12 and 13 year old children and results analysed in relation to measures of socioeconomic status, verbal intelligence, achievement and school marks. City wide testing surveys conducted during previous four years provided data on children for longitudinal comparisons. Results supported hypothesis that it is possible to measure a broad component of intellectual ability with significantly less cultural bias than is found in conventional Lorge-Thorndike Figure Analogies Subtests.

- A. MAISTRIAUX, R. L'intelligence Noire et Son Destin. Problemes d'Afrique Centrale 1955. 30, 255-285.

Discusses errors made by adult Africans and White Belgian retarded children. Errors from various groups show similarity in spite of differences of race and level of civilisation.

- MILLER, F.M. and RAVEN, J.C. The influence of Positional Factors on the Choice of Answers to Perceptual Intelligence Tests. Brit. J. Med. Psychol. 1939. 18: 44-52.

Test consisted of an incomplete matrix of relations. 6 or 8 alternatives were arranged below the matrix, one of which had to be selected as completing the pattern. If the problem was of moderate difficulty, the position of the correct alternative made little difference in the percentage of correct solutions, but favourite positions were apparent if the problem was too difficult for subject. In that case, correct results were obtained by chance if the right answer was in a favoured position. (This is one of the original papers describing the development of the Progressive Matrices.)

- A. MISITI, R. Presentazione del reattivo "Progressive Matrices" (adulti e fanciulli) di J.C. Raven. (Introducing the "Progressive Matrices" test (for adults and children) of J.C. Raven). *Ricerca Scientifica* 1954, 24, 5. 1052-1058.

The author introduces the "Progressive Matrices" both in the form for adults and in that for children. discussing particularly its general characteristics, scopes and classification, its history, stimulus characteristics, elaboration, interpretation, practical applications and results. There follow some critical remarks, twenty five bibliographical references, and an appendix illustrating the instructions for the administration of the test. (Text in Italian, summaries in French, English and German.)

- A.H. MONTAGUD, Rafael Ferrandis. Daremos del colegio nuestra Senora de Loreto. *Revista de Psicologia General y Aplicada* 1969, 24, 789-797.

Present norms for students at this college from the years 1963-1969 for the following tests: SPM, C-M, Goodenough's intelligence test for children and Anstey's Dominoes Test.

- C. ORME, J.W. Nonverbal and Verbal Performance in Normal Old Age, Senile Dementia and Elderly Depression. *J. Gerontol.* 1957, 12: 408-13.

Two independent tests of nonverbal (PM) and verbal (Mill Hill Vocabulary Scale) performance, standardized to age 65, were administered individually to selected groups of 51 healthy old people, 24 elderly depressives and 25 persons with senile dementia. Results suggest that in all old people, particularly those with senile dementia, may be a function fluctuation of intellectual ability. Depression in old age does not seem to manifest any disturbance of non-verbal and verbal performance compared with normal old people of approximately same age range. Decline with age of verbal performances seems to be important in senile dementia group, distinguishing them from the two groups of subjects above. So in senile dementia it would seem to be important to assess verbal deterioration as well as non-verbal deterioration.

- N. ORME, J.E. Hypothetically True Norms for the Progressive Matrices Tests. Human Development. 1965. 9. 222-230.

This paper examines the published norms of Standard and Coloured Progressive Matrices. It is argued that both the decline of ability in adult life and its increase in childhood, appear to be linear and of same order for all levels of ability. It is therefore possible to calculate "hypothetically true" norms. Apart from advantages of such a procedure, its feasibility supports the view that ability to solve Matrices type problems is a fundamental psychological process.

- C. PINKERTON, P. and KELLY, J. An Attempted Correlation between Clinical and Psychometric Findings in Senile Arteriosclerotic Dementia. J. Ment. Sci. 1952. 98. 244-255.

This paper presents a method which combines quantitative and qualitative data, (uses CPM and MHV) and attempts to relate emotional reaction of the patient to his deterioration. Method has been applied to 40 senile arteriosclerotic patients treated in a mental hospital. It is shown that, while the loss of ability to abstract determines the level of problem difficulty which the patient can master, his total efficiency depends not only on this loss but also on the emotional reaction to it. The results of the senile group were compared with those of children.

- C. QUALTERE, Thomas J. An Investigation of the Relationship Between Visual Figure-Background Disturbance and Performance on Raven's Progressive Matrices Test in Cerebral Palsy Children. Doctor's thesis. Syracuse University, 1957.

Purpose was to investigate relationship between visual figure background disturbance and performance on PM in cerebral palsy children. Subjects were 64 cerebral palsy children aged 6-15 years and divided into 32 spastic and 32 athetoid with 16 mild and 16 moderate cases in each. Each child given Stanford-Binet (L) & Ammons Test (to determine amount of visual figure background disturbance), Raven Colour Test and Raven Black and White Test. Significant differences found between performance on Raven's tests for all cerebral palsy children with visual figure-background disturbance. Those without this disturbance appeared to do significantly better on Raven's Black & White Test. Athetoid group better than spastics on both Raven's tests. Children with mild degree of handicap had better results than those with moderate handicap.

RAVEN, J.C. The R.E.C.I. Series of Perceptual Tests: An Experimental Survey. Brit. J. Med. Psychol. 1939. 18: 16-34.

A series of perceptual tests were given to children between ages of 4 & 14 in a small urban area and also to other selected groups of subjects. So possible to cover practically whole range of mental development from 2-1/2 to 14 years. Norms and standard deviations were computed and an analysis of component tests made. Causes of erroneous responses have been studied. Subjects whose scores were more than twice standard deviation above or below normal could not be differentiated. Insufficient data was obtained for conclusions to be drawn concerning subjects over 14 years. Scores of adults tested suggested that series would differentiate subjects over age of 14 into five classes, according to whether a subject was mentally defective, dull, normal, bright or of University standing, but would fail to differentiate between individuals within these groups. A revised series has been prepared on basis of this survey. (This is one of the original papers describing the early development of Progressive Matrices.)

RAVEN, J.C. Matrix Tests. Mental Health. 1940. 1: 10-8.

- C. RAVEN, J.C. Psychological principles appropriate to social and clinical problems. H.K. Lewis, London, 1956.

The first section describes the practical problems involved in interviewing children and adults in the assessment of their verbal statements and in the uses and limitations of questionnaires and mental tests. Second and longer section deals with theoretical principles. Personality and individuality are discussed in terms of 4 questions = variables and co-ordinates of every interview - that must be answered by the psychologist "in order to assess a person's ability to adapt to his surroundings so that he achieves what he wants to do in harmony with other people ...". Briefly these questions are (1) "How does a person's attention vary with time in its location, range and concentration? (2) Does his behaviour show well-defined intentions with respect to the past and future? (3) What does he enjoy as good or fear as evil? (4) How does he order his thinking with respect to himself and his surroundings?" Through these variables, "the psychologist is able to demonstrate characteristic differences in the things people say or do". The extent to which these variables are to be assessed is shown and problems requiring future research are indicated.

- C. REDA, G.C. I Tests di Efficienza Intellettiva. Lavoro Neuropsich. 1951. 9. 1-2. 77-97.

A review in Italian of available tests of intelligence, including discussion of MHV, SPM and CPM. Particular attention is given to the use of such tests for the identification of deterioration.

- A.N. REDA, G.C., NENCINI, R. and RICCIO, D. Contributo alla Taratura Italiana del Progressive Matrices 1937 e 1938 di J.C. Raven. Bolletino de Psicologia Applicata. 1955. 7-8, 15-23.

Norms for Italians are presented for children on the CPM based on results from 214 children aged 7-11. Norms on SPM are presented based on 400 subjects aged 16-89 and the effects of age, especially after 60, are demonstrated. (Text in Italian.)

- A. SINHA, Uma. The Use of Raven's Progressive Matrices Test in India. Indian Educl. Review 1968. 1 (1) 75-88.

Studies with PM in India are reviewed to show that the Matrices have been used for predicting achievement, measuring intelligence and for general psychometric interests. However, no study with regard to the validity of the tests in India has so far been recorded. Some results showing that engineering and architecture students do relatively better on this test indicate that the test is probably loaded with factors like K, which are likely to be more developed in engineering students. The tests correlate moderately with other verbal and non-verbal tests of intelligence used in India. The norms developed in different parts of India have to be interpreted properly, and a study of the validity of the tests is necessary.

- VAN DAM, F. Some Contributions to the error and scatter Analysis of PM 38 and CPM 47 tests - A Critical Survey Emphasising Sets A & B. Unpublished manuscript. Brussels, 1971.

A historical survey of item analysis and scatter analysis of the Matrices tests, reviewing work up to 1971, including work published in French.

- E. VENABLES, Ethel C. Social Differences Among Day Release Students in Relation to their recruitment and examination Success. Brit. J. Social and Clin. Psychol. 1963, 2: 138-52.

From a large scale and long term survey of the abilities of young technical college students, it is argued that failure in part time day classes can best be understood in relation to their heterogeneous nature and the differential motivations obtaining among the students. Youths from non-professional families fared at least as

well as those from professional backgrounds. This and other findings and possibilities are discussed in terms of the social class structure of the students.

- T. VERNON, P.E. Intelligence and Attainment Tests. Philosophical Library, New York, 1966.

Gives some general details about Progressive Matrices in the section on non-verbal tests. By age 50, the average adult has dropped back to the same level as 10 year old children on the Matrices.

- A. WEST, L.W. and MACARTHUR, R.S. Intelligence Tests for Two Samples of Metis and Indian Children. Alberta J. of Educ. Res. 1964. 10. 1. 17-27.

Purpose of study was to investigate a selection of culture reduced intelligence tests and to identify those which for two samples of Metis and Indian children at four grade levels, show a minimum of cultural bias. A battery of tests was given to 126 Metis children at the Faust school and an identical battery was given to 155 Indian and Metis children, at the Fort Simpson school. Relative extent of cultural bias in the tests was determined by comparing the means of the derived scores on the tests. Culture-reduced tests show (1) significantly less cultural bias than more conventional tests (2) substantial correlations with academic achievements (3) substantial correlations with other more conventional measures of intelligence and therefore they possess concurrent validity. The tests, were evaluated against four criteria, those tests which show greatest promise at each level for cross cultural assessment of intellectual ability have been identified. Progressive Matrices is recommended at all levels.

- YATES, Aubrey J. The Use of Vocabulary in the Measurement of Intellectual Deterioration - a Review. J. Ment. Sci. 1956. 102, 428, 409-440.

A detailed and critical review of the use of vocabulary tests to measure intellectual deterioration. Discusses Mill Hill Vocabulary and Matrices.

Author's Note

It will be noted that this bibliography is compiled from a wide variety of international sources. Every effort has been made to provide an adequate synopsis to guide those who wish to work with RPM. However, some titles lack synopses due to translation problems and others reflect varying degrees of fluency which could be improved by those with appropriate language skills. Improvements will be welcomed for inclusion in a revised bibliography.

In some instances, the original article has proved unobtainable in Australia and hence only the title is given. If others have access to articles which have no summary but are in English, a copy of these would be most welcome to make this work more complete.

Most abstracts are based directly on the original work modified in some instances to draw attention to the use of RPM or MHV in the work.

A number of the abstracts included in this bibliography have been reprinted from Psychological Abstracts with special permission from the American Psychological Association.